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TITLE: Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program

PRINCIPAL INVESTIGATOR: Marvella E. Ford, Ph.D.

CONTRACTING ORGANIZATION: The Medical University of South Carolina
Charleston, South Carolina 29425

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14. ABSTRACT

Background: There is a critical need to increase the racial/ethnic diversity of prostate cancer researchers. The purpose of this 3-year project was to develop a prostate cancer research training program at the Medical University of South Carolina (MUSC) with 12 students from the following three Historically Black Colleges and Universities (HBCUs) in South Carolina: Claflin University, South Carolina State University (SCSU), and Voorhees College. Students from the 3 HBCUs (defined as "Student Fellows") participated in research internships in the laboratories/research units of senior prostate cancer research scientists at MUSC. **Specific Aims**: Aim 1.) To provide training in the basics of research design and methods to 12 Student Fellows each year through participation in the MUSC Summer Undergraduate Research Program (SURP); Aim 2.) To immerse 4 Student Fellows each year in a prostate cancer research training curriculum. **Results:** During the current reporting period, 12 Student Fellows were identified, recruited to participate in the program, and admitted to the DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program. The Student Fellows were matched with Research Mentors at MUSC, with whom they conducted research in the summers of 2009-2011. Each Student Fellow prepared scientific papers, presented scientific presentations at the end of the summer program, and completed a 9-week Princeton Review Graduate Record Examination Test Preparation Course. In the summer of 2012, students at SCSU participated in summer program lectures via videoconference. **Conclusions:** State-of-the art comprehensive prostate cancer research education and training opportunities were provided to **12** Student Fellows from HBCUs in South Carolina. Each Student Fellow prepared a scientific paper and gave at least 1 scientific presentation. Three Student Fellows had abstracts accepted for poster presentation at national scientific meetings, and 1 Student Fellow's abstract was accepted for oral presentation at a local meeting. A cadre of scientists who are well-prepared to conduct research spanning the continuum from basic science to clinical science to population-based research was developed.

Table of Contents

INTRODUCTION

The Scientific Context of the Training Program

The overarching goal of the Training Program is to recruit the next generation of prostate cancer researchers by exposing undergraduate students ("Student Fellows") from Claflin University (CU), South Carolina State University (SCSU), and Voorhees College (VC) to prostate cancer research at the Medical University of South Carolina (MUSC), and training them to meaningfully participate in such research activities. **Basic science and clinical researchers** are needed to aggressively pursue and test better methods to decode the prostate cancer fingerprints, which hold the key to understanding the relationship between gene expression and future prognosis. **Population science researchers** are needed who will identify barriers and facilitators of prostate cancer early detection and treatment, and develop strategies to overcome them. The Training Program will provide a pipeline for future generations of these prostate cancer researchers.

The two Specific Aims are to:
Aim 1: Provide training in the basics of research design and methods to 12 Student Fellows each year through participation in the MUSC Summer Undergraduate Research Program (SURP).

Aim 2: Immerse 12 Student Fellows each year in a prostate cancer research training curriculum.

Program Director and Training Team

Dr. Marvella E. Ford is the Program Director. Drs. Rebecca Bullard- Dillard (CU), Judith Salley (SCSU), and Leroy Davis (VC) are Associate Directors. This four-person leadership team collaborates closely in the management and administration of the award, as well as the continued development and enhancement of the Training Program. The Program Director and Associate Directors share scientific interests in health disparities, serve in other leadership roles within their institutions, and meet frequently, both formally and informally. These individuals form the Executive Committee for the Training Program. Each institution has appointed Faculty Advisors consisting of Dr. Leslie Wooten-Blanks (CU), Dr. James B. Stukes (SCSU), and Ms. Gayle Tyler Stukes (VC).

BODY

Statement of Work

Task 1. Identify and Recruit the Student Fellows

(a) Identify the pool of potential Student Fellows (Year 1, months 1-3; Year 2, months 1-3; Year 3, months 1-3)
(b) Interview the potential Student Fellows (Year 1, months 1-3; Year 2, months 1-3; Year 3, months 1-3)
(c) Select the top Student Fellows (Year 1, months 1-3; Year 2, months 1-3; Year 3, months 1-3)
(d) Match the Student Fellows with Their Research Mentors at MUSC (Year 1, months 1-3; Year 2, months 1-3; Year 3, months 1-3)
(e) Hold the Kickoff Intensive and Luncheon (Year 1, months 4-6; Year 2, months 4-6; Year 3, months 4-6)

Deliverables: Four Student Fellows per year were identified, recruited to participate in the program, and matched with senior prostate cancer research mentors at MUSC.

Task 2. Provide Training in Biomedical and Prostate Cancer Research

(a) Conduct Aim 1: Training in the Basics of Research Design and Methods through participation in the MUSC Summer Undergraduate Research Program (Year 1, months 6-8; Year 2, months 6-8; Year 3, months 6-8)
(b) Conduct Aim 2: Prostate Cancer Research Training (Year 1, months 6-8; Year 2, months 6-8; Year 3, months 6-8)
(c) Sponsor the Student Fellows' Participation in a Graduate Record Examination (GRE) course (Year 1, months 6-8; Year 2, months 6-8; Year 3, months 6-8)
(d) Invite former Student Fellows who have not yet graduated to participate in ongoing prostate cancer research activities (e.g., scientific seminars, journal clubs, etc.) at the Medical University of South Carolina (MUSC) Hollings Cancer Center through videoconferencing. (Years 2, 3, and beyond)

Deliverables: We provided state-of-the art comprehensive prostate cancer research education and training opportunities for 12 students from three of South Carolina's HBCUs. We have developed a cadre of scientists who are well-prepared to play a significant role in discovering and testing new prostate cancer biomarkers. These investigators will conduct research spanning the continuum from basic science to clinical science to population-based research. At least 75% of the Student Fellows will take the GRE and at least 75% of the Student Fellows will apply to graduate school.

Task 3. Prepare Tangible Scientific Products

(a) Prepare and present scientific abstracts based on the Student Fellows' prostate cancer research (Year 1, months 10-12, Year 2, months 1-12, Year 3, months 1-12)
(b) Prepare manuscripts that will be submitted to peer-reviewed journals (Year 1, months 10-12, Year 2, months 1-12, Year 3, months 1-12)
(c) Develop manuscripts to describe the scope and outcomes of the project (Year 3, months 9-12)

Deliverables: At least 10 scientific presentations will be conducted by Student Fellows. At least 6 peer reviewed publications will result.

Task 4. Evaluate the Training Program

(a) Assess the number of applicants to the Training Program (Year 1, months 1-4, year 2, months 1-4, Year 3, months 1-4)

(b) Assess the number of Student Fellows who apply to graduate school (Year 2, months 1-12, Year 3, months 1-12)
(c) Assess the number of Student Fellows who are admitted to graduate school (Year 2, months 1-12, Year 3, months 1-12)
(d) Assess the number of graduate schools to which Student Fellows are admitted (Year 2, months 1-12, Year 3, months 1-12)
(e) Employ several tracking mechanisms to monitor the scientific progress of the students, including:
    1. Searching the MUSC graduate program databases to identify whether any of the students applied, were offered, or accepted positions at MUSC.
    2. Contacting the participating universities' alumni offices.
    3. Employing other internet based search tools/communications (Google, MySpace, Facebook, and Historically Black College/University Connections, etc.) to identify students' current locations, contact information, and academic achievements (Years 2, 3, and beyond)
(f) Identify the number of scientific abstracts presented and peer-reviewed publications that result (Year 1, months 10-12, Year 2, months 1-12, Year 3, months 1-12)

Deliverables: We will prepare a document assessing the tangible products that result from the Training Program.

KEY RESEARCH ACCOMPLISHMENTS

Task 1. Identify and Recruit the Student Fellows

(a) **Identify the pool of potential Student Fellows (Year 1, months 1-3; Year 2, months 1-3; Year 3, months 1-3)**

(b) **Interview the potential Student Fellows (Year 1, months 1-3; Year 2, months 1-3; Year 3, months 1-3)**

(c) **Select the top Student Fellows (Year 1, months 1-3; Year 2, months 1-3; Year 3, months 1-3)**

To accomplish Tasks 1(a) – 1(c), Dr. Ford, the Program Director worked with Associate Directors Dr. Rebecca Bullard-Dillard (Claflin University), Dr. Judith Salley (SC State University), and Dr. Leroy Davis (Voorhees College) as well as Faculty Advisors Dr. Leslie Wooten-Blanks (Claflin University), Dr. James Stukes (SC State University), and Ms. Gayle Stukes (Voorhees College) to identify potential Student Fellows. The Associate Directors and Faculty Advisors issued a call for applicants to their student bodies and personally approached students whom they felt would be outstanding applicants for the summer research program.

For example, Drs. Ford (Principal Investigator), Bullard Dillard (Associate Director), Salley (Associate Director), and Davis (Associate Director) communicated via electronic mail to discuss the 2011 SURP application process and deadlines.

To cite another example, to broaden the pool of potential applicants, each Associate Director invited faculty and students from his/her institution to participate in the Ernest Just Symposium held on February 26, 2010 at MUSC. A total of 73 students from the three HBCUs attended the symposium (Table 1.). The students who participated in the symposium also received a tour of the MUSC campus and met with MUSC faculty members who could become their future summer research mentors. The DOD grant funds covered travel expenses for two faculty members from Voorhees College who requested travel assistance. All other individuals listed paid for their own travel.

Table 1. 2010 Ernest E. Just Symposium Attendees - February 26th, 2010	
Student Names	**Institution**
Jessica Abercrombie	Claflin University
Brittany Anderson	Claflin University
Meaghen Ashby	Claflin University
LaTisha Clark	Claflin University
Charlyn Daughty	Claflin University
La'Nequa Ferguson	Claflin University
LaQuanna S. Gathers	Claflin University
Emerald Harrison	Claflin University
April Haskell	Claflin University
Alquetta Hawkins	Claflin University
Vaughn Heyliger	Claflin University
Neema Hooker	Claflin University
Paul L. Isaac	Claflin University
Daniela Lancaster	Claflin University
Darcel Lancaster	Claflin University
Samona Lawrence	Claflin University
Tamara Planter	Claflin University
Denita Pleasant	Claflin University
Dorea Pleasant	Claflin University
Brittany Orange	Claflin University
Lakya Rice	Claflin University
Bianca Thomas	Claflin University
Ambria Turner	Claflin University
# Students From Claflin University	**23**

Table 1 (Continued). 2010 Ernest E. Just Symposium Attendees - February 26th, 2010	
Student Names	**Institution**
Angel Agbatutu	SC State University
Matt Brigmon	SC State University
Gabrielle Dillard	SC State University
Chantal Johnson	SC State University
Shela Mainor	SC State University
Alyssa Murray	SC State University
Anthony Myers	SC State University
Charlencia Owens	SC State University
Janel Randolph	SC State University
Jaquanique Sanders	SC State University
Deanna Seabrooks	SC State University
Cedric Shamley	SC State University
Templeton Tisdale	SC State University
Michael Young	SC State University
# Students From SC State University	**14**

Also, to broaden the pool of potential applicants, each Associate Director invited faculty and students from

Table 1 (Continued). 2010 Ernest E. Just Symposium Attendees - February 26th, 2010	
Student Names	**Institution**
Jasmine Addison	Voorhees College
Michael Akinpelu	Voorhees College
Brittany Allen	Voorhees College
Rashell Blake	Voorhees College
Ceyne Blow	Voorhees College
Kalin Bright	Voorhees College
Blair Britton	Voorhees College
Jennifer Brown	Voorhees College
Nakeya Brown	Voorhees College
Sierra Brooks	Voorhees College
Latoya Brunson	Voorhees College
Jasmine Fields	Voorhees College
Hollie Garnett	Voorhees College
Shantez Givens	Voorhees College
Domonik Hamilton	Voorhees College
Latasha Haynes	Voorhees College
Brittany Horton	Voorhees College
Kemar Hunter	Voorhees College
John Jackson	Voorhees College
Shateria Keel	Voorhees College
David Monely	Voorhees College
Edward McMorris	Voorhees College
Tyquan Parker	Voorhees College
Christopher Reeves	Voorhees College
Celina Ridgeway	Voorhees College
Janay Robinson	Voorhees College
Terea Ross	Voorhees College
Janielle Samuel	Voorhees College
Branton Smith	Voorhees College
Britney Smith	Voorhees College
Phillip Smith	Voorhees College
Romeka Taylor	Voorhees College
Brionca Walker	Voorhees College
Pia West	Voorhees College
Adrian Williams	Voorhees College
Page Williams	Voorhees College
# Students From Voorhees College	**36**
TOTAL # STUDENTS	**73**

his/her institution to participate in the Ernest Just Symposium held on February 25, 2011 at MUSC. A total of 51 students from the three HBCUs attended the symposium (see following table.). The students who participated in the symposium also received a tour of the MUSC campus and met with MUSC faculty members who could become their future summer research mentors. The DOD grant funds covered travel expenses for two faculty members from Voorhees College who requested travel assistance. All other individuals listed paid for their own travel.

(d)

Ernest Just Symposium Student Attendees - February 25, 2011	
Student Names	**Institution**
Courtney Anderson	Claflin University
Keaira Berry	Claflin University
Camille Brown	Claflin University
Dorneisha Brown	Claflin University
Maurissa Charles	Claflin University
Jasmine Elliot	Claflin University
Kayla Felix	Claflin University
Jessica Fuller	Claflin University
Kendrick Henderson	Claflin University
Khirston Howard	Claflin University
Candice Jenkins	Claflin University
Marleah Johnson	Claflin University
Lakia Mansell	Claflin University
Ezinne Mong	Claflin University
Torez Moody	Claflin University
Britanny Orange	Claflin University
Lynelle Pompey	Claflin University
Donna Sellers	Claflin University
Muhammad Sheraz	Claflin University
Faith Simmons	Claflin University
Minakchhi K. Singh	Claflin University
Ericka Smith	Claflin University
Destynei Tiller	Claflin University
Tamara Wilks	Claflin University
Brook Williams	Claflin University
Rachael Woods	Claflin University
# Students From Claflin University	**26**

Ernest Just Symposium Student Attendees - February 25, 2011 (Continued)	
Student Names	**Institution**
Jasmine Addison	Voorhees College
Brittany Allen	Voorhees College
Tandria Allen	Voorhees College
Kalin Bright	Voorhees College
Latgera Brunson	Voorhees College
Derickeo Cooper	Voorhees College
Ieshia Cooper	Voorhees College
Jessica Dingle	Voorhees College
Katrina Dunn	Voorhees College
Jamie Eaddy	Voorhees College
Hollie Garnett	Voorhees College
Willette Hudson	Voorhees College
John Jackson	Voorhees College
Monica Johnson	Voorhees College
Antavius Jones	Voorhees College
David Maloney	Voorhees College
Edward McMorris	Voorhees College
Tyquan Parker	Voorhees College
Javasha Scott	Voorhees College
Branton Smith	Voorhees College
Britney Smith	Voorhees College
Thomas Sumter	Voorhees College
Dabien Turner	Voorhees College
Brionca Walker	Voorhees College
Kendrea Williams	Voorhees College
# Students from Voorhees College	**25**
TOTAL # STUDENTS	**51**

(e) **Match the Student Fellows with Their Research Mentors at MUSC (Year 1, months 1-3; Year 2, months 1-3; Year 3, months 1-3)**

In each year, the Student Fellows were matched with their Research Mentors at MUSC based on the expressed interests of the Student Fellows. The following tables show the names of the students who participated in the DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program, their Research Mentors at MUSC, and their research topics.

The Student Fellows were matched with their Research Mentors at MUSC based on the expressed interests of the Student Fellows. For example, Ms. Scharan Clarke expressed an interest in clinical research in her application, so she was matched with Dr. Harry Clarke (no relation) a urologist who conducts prostate cancer clinical research at MUSC. Ms. Clarke had an opportunity to shadow Dr. Clarke as he conducted his clinical research. The following tables show the names of the students who participated in the 2009-2012 DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program, their Research Mentors at MUSC, and their research topics.

Summer 2009 DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program Students, Mentors, and Research Topics

Student Name	Academic Institution	MUSC Research Mentor	Research Topic
Ms. Scharan Clarke	Claflin University	Dr. Harry Clarke	Does the Preoperative Evaluation of Men with Bladder Obstruction Affect the Outcomes of Outlet Reduction Procedures?
Ms. Andrea Gibson	Claflin University	Dr. Christina Voelkel-Johnson	Enhancing Gene Delivery to Cancer Cells
Ms. Co-Danielle Green	SC State University	Dr. Danyelle Townsend	Role of ABCA2 in Prostate Tumor Progression
Ms. Samantha Jones	SC State University	Drs. Shikhar Mehrotra and Mike Nishimura	Isolation and *Ex Vivo* Expansion of Antigen-Specific CD8+ T cells

Summer 2010 DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program Students, Mentors, and Research Topics

Student Name	Academic Institution	MUSC Research Mentor	Research Topic
Mr. DeAngelo Dinkins	SC State University	Dr. Christina Voelkel-Johnson	Redox protein expression and susceptibility to therapeutic intervention in ARCaP prostate cancer cells
Ms. Ebonie Fuller	SC State University	Dr. Marvella E. Ford	Evaluating an Intervention to Improve Perceptions of Cancer Clinical Trials among Racially Diverse Communities in South Carolina
Mr. Jonathan Brown	Claflin University	Dr. Danyelle Townsend	NOV-002 Induces S-Glutathionylation of Serpin A1 and A3 in Human Plasma
Ms. Scharan Clarke	Claflin University	Dr. Harry Clarke	What Factors Can Predict the Success of Sacroneuromodulation When Used in Patients with Urinary Retention

In 2011, the list of students did not include students from Voorhees College, which is a small private academic institution and their pool of students has been decreased from previous years. Due to another funding source that stipulates funding for only Voorhees College, the two students recruited from Voorhees College who participated in SURP took part in that funding source instead of this one. We are working with the Dr. Davis to ensure inclusion of Voorhees College students in future summers.

Summer 2011 DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program Students, Mentors, and Research Topics			
Student Name	**Academic Institution**	**MUSC Research Mentor**	**Research Topic**
Mr. Jonathan Brown	Claflin University	Dr. Danyelle Townsend	Glutathione S-Transferases pi (GSTpi) Catalyzes PSSG of Serpins A1 and A3 in Mouse Plasma
Ms. Jazzmine Clemons	Claflin University	Dr. Shikhar Mehrotra	The effect of cytokines on T cell antioxidant capacity
Mr. Kendrick Henderson	Claflin University	Dr. Sebastiano Gattoni-Celli	The role of vitamin D and parathyroid hormone in African Americans and Caucasians with early stage prostate cancer
Ms. Claudia Thompson	SC State University	Dr. Harry S. Clarke	Hormone Supplementation and Risk for Prostate Cancer

(e) **Hold the Kickoff Intensive and Luncheon (Year 1, months 4-6; Year 2, months 4-6; Year 3, months 4-6)**

The Kickoff Intensive and Luncheon took place each year during the first meeting of the didactic training program in prostate cancer research. The Associate Directors from the partnering institutions gave presentations to the students. Dr. Ford gave an overview of the DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program.

On Thursday, June 4, 2009, the Associate Directors from the partnering institutions gave presentations to the students. Dr. Ford gave an overview of the DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program.

On Thursday, June 8, 2010. Dr. Ford gave an overview of the DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program. On June 17, 2010, the Associate Directors from the partnering institutions gave presentations to the students. Their presentations highlighted their cancer disparities research.

The 2011 Kickoff Intensive and Luncheon of the didactic training program in prostate cancer research took place over the course of two phases on June 7-8, 2011. On Tuesday, June 7, 2011 a small group meeting was held with the Student Fellows to introduce them to the internal training team, and review the student handbook. The student handbook was developed to provide the students with a detailed resource that describes the infrastructure of the training program as well as the expectations of the students. On Wednesday, June 8, 2011, a formal reception was held and Dr. Carolyn Reeves, Associate Director of HCC gave a welcome and overview of the HCC and Dr. Ford gave an overview of the DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program. All HCC staff, faculty and mentors were invited and attended the event.

Task 1 Deliverables: Twelve Student Fellows were identified, recruited to participate in the program, and admitted to the DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program. The Student Fellows were matched with Research Mentors at MUSC, with whom they conducted research in the summers of 2009-2011.

Task 2. Provide Training in Biomedical and Prostate Cancer Research

(a) Conduct Aim 1: Training in the Basics of Research Design and Methods through participation in the MUSC Summer Undergraduate Research Program (Year 1, months 6-8; Year 2,months 6-8; Year 3, months 6-8)

The Student Fellows participated in an intensive training program in the Basics of Research Design and Methods through participation in the MUSC Summer Undergraduate Research Program (SURP). The following tables show the SUPR curricula from 2009-2011.

Summer Undergraduate Research Program Lecture Series

Summer 2009

Location: BSB 302, 8:30-9:30 AM

Date	***Topic***	***Lecturer***
	Biomedical Ethics – MANDATORY – 9 – 10:50 am	
June 1	Responsible Lab Citizenship **Note time for this day only: 9-9:50 am**	Dr. Ed Krug
June 2	Public Perceptions of Scientific Research – Questionable Research Practices ("And the Band Played On" video and discussion) 9 – 10:15 am	Dr. Ed Krug
	Human Subjects Research (lecture & discussion) 10:20 to 10:50 am	Dr. Susan Sonne
June 3	Moral Reasoning in Ethical Dilemmas (lecture and case study discussion) 9:00 to 9:50 am	Dr. Ed Krug
	Mentoring (lecture and discussion) 10:00 – 10:25 am	Dr. Ed Krug
	Animal Use in Research (lecture & discussion) 10:25 to 10:50 am	Dr. Alison Smith
June 4	Data Management/Data Manipulation (Lecture and case study discussion) 9:00 to 9:50 am	Dr. Ed Krug
	Authorship and Plagiarism (lecture and case study discussion) 10:00 to 10:50 am	Dr. Ed Krug
June 5	Research Misconduct/Whistleblower Protections (lecture and literature discussion) 9:00 to 9:50 am	Dr. Ed Krug
	Closing Comments/Exit Evaluation (10:00 to 10:50 am)	

Outside Assignment: Complete the University of Montana On-Line RCR training (link below) - you must score a minimum of 70% on all quizzes. Submit paper copies of quiz completion to Debbie Shoemaker (BSB102) **no later than 4 PM Friday, June 19**.
(http://ori.dhhs.gov/education/products/montana_round1/research_ethics.html

June 8	Pub Med	Library Staff
June 9	Developmental Biology	Dr. Kern
June 10	Cell Biology – Tissue Ultrastructure	Dr. Hazen Martin
June 11	Receptors	Dr. Rosenzweig
June 12	Lipidomics	Dr. Del Poeta
June 15	Stem Cells	Dr. LaRue
June 16	C – Cancer Cell Cycle	Dr. Wright
June 17	The Heart	Dr. Halushka
June 18	Confocal Microscopy	Dr. Lemasters
June 19	Microarray Analysis	Dr. Barth

June 22	Proteomics Technology	Dr. Lauren Ball –
June 23		
June 24		
June 25	Recombinant DNA	Dr. Kurtz
June 26	Transcription	Dr. Kubalak
June 29	(H) Arterial Pressure Control & High Blood Pressure	Dr. Halushka
June 30	C – Cytogenetics	Dr. Wolff
July 1	Retinoids & Vision	Dr. Crouch
July 2	G Proteins	Dr. Hildebrandt
July 6	(H) Electrical Properties of the Heart	Dr. Haemmerich
July 7	N - Dementia	Dr. Kindy
July 8	N – ADD/ADHD	Dr. Lavin
July 9	H – Congenital Heart Disease	Dr. McQuinn
July 10	C – Kinds of Cancer	Dr. Gemmill
July 13	H – Imaging the Heart	Dr. Costello
July 14	H – Atherosclerosis	Dr. Hammad
July 15	C – Cancer Chemotherapy	Dr. Kurtz
July 16	N – Addiction & Alcohol	Dr. Corrigan Smothers
July 17	H - Aspirin & NSAIDS	Dr. Halushka
July 20	C – Herbals & Cancer	Dr. Wargovich
July 21	N – Neuroimaging	Dr. George
July 22	C – Epidemiology of Cancer	Dr. Alberg
July 23	C – Pathology Museum	TBA
July 24	N – Neuroimaging lab demonstration	Dr. Mark George
July 27	H – Kidney	Dr. Soltis
July 28	Spinal Cord Injury	Dr. Banik
July 29	Schizophrenia	Dr. Lavin
July 30	N-Addiction & Drugs	Dr. Knackstadt

Note: Lectures in Black are for all students.
Lectures in Blue are for Cardiovascular track students.
Lectures in Red are for Cancer track students.
Lectures in Green are for Neuroscience track students.

Summer Undergraduate Research Program Lecture Series

Summer 2010

Location: BSB 302, 8:30-9:30 AM

Date	***Topic***	***Lecturer***
June 8	What is Translational Research?	Dr. Kathleen T. Brady M.D., Ph.D.
June 9	The Development of a New Treatment and Diagnostic Test for Bladder Cancer: From Bench to Bedside	Dr. Perry Halushka, PhD, MD
June 10	Human Subject Research Success Center: How Scientists Get Help Conducting Research/**Examples of Translational Research**	Dr. Susan C. Sonne, PharmD. / Royce Sampson, MSN, RN
June 11	Treatment of Cocaine Addiction: From Bench to Bedside	Khaled Moussawi, MD/PhD Student
June 14	Hepatic Steatosis in a Growing World: The Impact On Transplantation	Dr. Kenneth Chavin, MD, PhD
	Responsible Conduct of Research – MANDATORY – 8:30 – 10:20 am	
June 15	***MANDATORY:* Public Perceptions of Scientific Research –Questionable Research Practices ("And the Band Played On" video and discussion)**	**Dr. Ed Krug, PhD Dr. Titus Reaves, PhD**
June 16	***MANDATORY:* Moral Reasoning in Ethical Dilemmas (lecture and case study discussion)**	**Dr. Ed Krug, PhD**
	Mentoring (lecture and discussion)	**Dr. Ed Krug, PhD**
	Responsible Lab Citizenship	**Dr. Ed Krug, PhD**
June 16	(C) Cancer Cell Cycle (lunch meeting location TBA)	Dr. Cynthia Wright, PhD
June 17	***MANDATORY:* Data Management/Data Manipulation (Lecture and case study discussion)**	**Dr. Ed Krug, PhD**
	Authorship and Plagiarism (lecture and case study discussion)	**Dr. Ed Krug, PhD**
June 18	***MANDATORY:* Animal Use in Research (lecture & discussion)**	**Dr. Alison Smith, PhD**
	Research Misconduct/Whistleblower Protections (lecture and literature discussion)	**Dr. Ed Krug, PhD**
	Closing Comments/Exit Evaluation	

Outside Assignment: Complete the University of Montana On-Line RCR training (link below) by June 14th - you must score a minimum of 70% on all quizzes. Bring paper copies of quiz completion with you to the RCR Lectures starting on June 15th.
(http://ori.dhhs.gov/education/products/montana_round1/research_ethics.html

June 21	Lipidomics	Dr. Maurizio Del Poeta, MD
June 22	Stem Cells	Dr. Amanda LaRue, PhD

June 23	Cell Biology – Tissue Ultrastructure	Dr. Debra Hazen-Martin, PhD
June 23	(M) Introduction to Oceans and Human Health (8:30-9:30) Climate Change Game – Mitigation Strategies (9:30-10:30)	Jillian Lynch Dr. Kristin Hardy, PhD Dr. Mackenzie Zippay, PhD
June 24	Developmental Biology	Dr. Michael Kern, PhD
June 24	(M) Harmful Algal Blooms (HABs) and Their Impact on Human Health (8:30-9:30am) Discussion (9:30-10:30am)	Dr. Fran Van Dolah, PhD Peter Feltman
June 25	Proteomics Technology	Dr. Lauren Ball, PhD
June 28	(H) The Heart	Dr. Perry Halushka, PhD, MD
June 29	Confocal/Multiphoton Microscopy of Living Cells And Tissues	Dr. John Lemasters, MD, PhD
June 30	Microarray Analysis	Dr. Jeremy Barth, PhD
June 30	(M) Algal Biofuels (9:30-10:30am) Discussion (10:30-11:30am)	Dr. Chris Hintz, PhD Amber Wilkinson
July 1	Recombinant DNA	Dr. David Kurtz, PhD
July 2	Transcription	Dr. Steven Kubalak, PhD
July 5	(M) Epidemiology and Human Health (8:30-9:30am)	Dr. Tom Hulsey, PhD
July 6	(H) Electrical Properties of the Heart	Dr. Rupak Mukherjee, PhD
July 6	(M) Pre-term Births and the Environmental Connection Part I (12:00-1:30pm)	Dr. Roger Newman, PhD Dr. Ramsey Unal, PhD
July 7	(C) Cytogenetics	Dr. Daynna Wolff, PhD
July 7	(M) Links Between Alzheimers Disease and the Marine Environment (8:30-9:30am)	Dr. Mark Kindy, PhD
July 8	(N) Retinoids & Vision	Dr. Masahiro Kono, PhD
July 8	(M) Marine Mammal Surfactants and Their Role in Role in Pre-Term Birth Defects (8:30-9:30am) Visit Premature Infant Clinic (9:30-11:30am)	Dr. John Baatz, PhD
July 9	G Proteins	Dr. John Hildebrandt, PhD
July 9	(M) Causes and Consequences of Disease in Marine Sentinel Species (MSS) (8:30-9:30am) Discussion (9:30-10:30am)	Dr. Lori Schwacke, PhD Leslie Burdett
July 12	(H) Arterial Pressure Control & High Blood Pressure	Dr. Perry Halulshka, PhD, MD
July 12	(M) Oceans and Human Health Part II (8:30-9:30am) Discussion (9:30-10:30am) How to make a poster (12:00-1:00pm)	Jillian Lynch Dr. Kristin Hardy Dr. Mackenzie Zippay, PhD
July 13	(N) Dementia	Dr. Mark Kindy, PhD
July 13	(M) Ecotoxicology: A Survey of Marine Contaminants and the Consequences (8:30-9:30am) Discussion: Contaminants of Emerging Concern	Dr. Geoff Scott, PhD Krystal Ludwig

	(9:30-10:30am)	
July 14	(N) ADD/ADHD	Dr. Tomas Tampa, PhD
July 14	(M) Marine Natural Pharmaceutical Products (8:30-9:30am) Discussion (9:30-10:30am)	Dr. Peter Moeller, PhD Matt Bertin
July 15	(C) Kinds of Cancer	Dr. Robert Gemmill, PhD
July 15	(M) Natural Products in the Clinic (8:30-9:30am) Discussion (9:30-10:30am)	Dr. Mike Wargovich Dina Brown
July 16		
July 16	(M) The Global Context of OHH (8:30-9:30am) NOAA Structure & Opportunities (9:30-10:30am) MBES Student Research Day (12:00-4:00pm)	Dr. Juli Trtanj
July 19	(N) Addictions & Alcohol	Dr. Scott Stewart, MD
July 20	Receptors	Dr. Steven Rosenzweig, PhD
July 20	(M) Powerpoint Presentation Workshop	
July 20	(M) Alternative Careers in Science (12-1pm)	Dr. Craig Plante, PhD
July 21	(C) Herbals & Cancer	Dr. Michael Wargovich, PhD, FACN
July 22	(N) Neuroimaging lab demonstration	Dr. Mark George, MD
July 23	(C) Epidemiology of Cancer	Dr. Kristin Wallace, PhD
July 26	(M) Ecology of Human Pathogens in Coastal and Other Natural Waters (8:30-9:30am) Discussion: Pathogens in the Marine Environment – A Public Health Perspective (9:30-10:30am)	Dr. Erin Lipp, PhD
July 26	(H) Atherosclerosis	Dr. Samar Hammad, PhD
July 27	(C) Cancer Chemotherapy	Dr. David Kurtz, PhD
July 27	(M) Marine Science Media and Communication (12-1pm)	Dr. Carolyn Sotka, PhD
July 28	(N) Neuroimaging	Dr. Mark George, MD
July 29	(H) Kidney	Dr. Ed Soltis, PhD
July 30	(H) Imaging the Heart	Dr. Joseph Schoepf, MD
Aug 2	(N) Spinal Cord Injury	Dr. Narendra Banik, PhD
Aug 3	(N) Schizophrenia	Dr. Antonieta Lavin, PhD
Aug 4	(C) Pathology Museum	TBA
Aug 5	H) Aspirin & NSAIDS	Dr. Perry Halushka, PhD, MD
Aug 6	(N) Addictions & Drugs	Dr. Kimber Price, PhD
Aug 9	Presentations (all day)	
Aug 10	Presentations (all day)	
Aug 11	Presentations (all day)	
Aug 12	Presentations (if another day is needed)/students will finish up with mentors and the dean's office	

Aug 13 Final checks disbursed, all paperwork turned in, labs cleared out

Note: Lectures in Black are for all students.
Lectures in Blue are for Cardiovascular track students. (7 lectures)
Lectures in Red are for Cancer track students. (7 lectures)
Lectures in Green are for Neuroscience track students. (9 lectures)
Lectures in Orange are for Marine Biomedicine (Ocean & Human Health) track students. Location: The White House at Fort Johnson
CTSA – (5 lectures)

Summer Undergraduate Research Program Lecture Series

Summer 2011

Location: BSB 302, 8:30-9:30 AM (unless otherwise noted)

Date	***Topic***	***Lecturer***
June 1	What is Translational Research?	Dr. Kathleen T. Brady M.D., Ph.D.
June 2	The Development of a New Treatment and Diagnostic Test for Bladder Cancer: From Bench to Bedside	Dr. Omar Moussa, PhD
June 3	Human Subject Research Success Center: How Scientists Get Help Conducting Research/**Examples of Translational Research**	Dr. Susan C. Sonne, PharmD-confirmed Royce Sampson, MSN, RN
	Responsible Conduct of Research – MANDATORY – 8:30 – 10:20 am	
June 6	***MANDATORY:* Public Perceptions of Scientific Research –Questionable Research Practices ("And the Band Played On" video and discussion)**	**Dr. Ed Krug, PhD-confirmed** **Dr. Titus Reaves, PhD**
June 7	***MANDATORY:* Moral Reasoning in Ethical Dilemmas (lecture and case study discussion)** **Mentoring (lecture and discussion)** **Responsible Lab Citizenship**	**Dr. Ed Krug, PhD-confirmed** **Dr. Ed Krug, PhD-confirmed** **Dr. Ed Krug, PhD-confirmed**
June 8	***MANDATORY:* Data Management/Data Manipulation (Lecture and case study discussion)** **Authorship and Plagiarism (lecture and case study discussion)**	**Dr. Ed Krug, PhD-confirmed** **Dr. Ed Krug, PhD-confirmed**
June 9	***MANDATORY:* Animal Use in Research (lecture & discussion)** **Research Misconduct/Whistleblower Protections (lecture and literature discussion)** **Closing Comments/Exit Evaluation**	**Dr. Alison Smith, PhD** **Dr. Ed Krug, PhD-confirmed**
June 10	Treatment of Cocaine Addiction: From Bench to Bedside	TBA
June 13	Hepatic Steatosis in a Growing World: The Impact On Transplantation	Dr. Kenneth Chavin, MD, PhD

Outside Assignment: Complete the University of Montana On-Line RCR training (link below) by June 13th - you must score a minimum of 70% on all quizzes. Bring paper copies of quiz completion with you to the RCR Lectures starting on June 6th.
(http://ori.dhhs.gov/education/products/montana_round1/research_ethics.html

June 14	Lipidomics	Dr. Maurizio Del Poeta, MD-confirmed
June 15	Stem Cells	Dr. Amanda LaRue, PhD-confirmed
June 16	Cell Biology – Tissue Ultrastructure	Dr. Debra Hazen-Martin, PhD

June 17	Developmental Biology	Dr. Michael Kern, PhD
June 20	Proteomics Technology	Dr. Lauren Ball, PhD-confirmed
June 21	(H) The Heart	Dr. Perry Halushka, PhD, MD-confirmed
June 22	Confocal/Multiphoton Microscopy of Living Cells And Tissues	Dr. John Lemasters, MD, PhD
June 23	(C) Cancer Cell Cycle	Dr. Cynthia Wright, PhD
June 24	Microarray Analysis	Dr. Jeremy Barth, PhD
June 27	Recombinant DNA	Dr. David Kurtz, PhD
June 28	Transcription	Dr. Steven Kubalak, PhD-confirmed
June 29	(H) Electrical Properties of the Heart	Dr. Rupak Mukherjee, PhD
June 30	(C) Cytogenetics	Dr. Daynna Wolff, PhD
July 1	(N) Retinoids & Vision	Dr. Masahiro Kono, PhD-confirmed
July 5	G Proteins	Dr. John Hildebrandt, PhD
July 6	(H) Arterial Pressure Control & High Blood Pressure	Dr. Perry Halulshka, PhD, MD-confirmed
July 7	(N) Dementia	Dr. Mark Kindy, PhD
July 8	(N) ADD/ADHD	Dr. Antonieta Lavin, PhD
July 11	(C) Kinds of Cancer	Dr. Robert Gemmill, PhD
July 12	Receptors	Dr. Steven Rosenzweig, PhD
July 13	(N) Spinal Cord Injury	Dr. Narendra Banik, PhD
July 14	(H) Aspirin & NSAIDS	Dr. Perry Halushka, PhD, MD-confirmed
July 15	(C) Herbals & Cancer	Dr. Michael Wargovich, PhD-confirmed
July 18	(C) Cancer Disparities	Dr. Marvella Ford, PhD
July 19	(N) Addictions & Drugs	Dr. Kimber Price, PhD
July 20	(C) Epidemiology of Cancer	Dr. Kristen Wallace, PhD-confirmed
July 21	(H) Atherosclerosis	Dr. Samar Hammad, PhD
July 22	(C) Cancer Chemotherapy	Dr. David Kurtz, PhD
July 25	(N) Neuroimaging Lab Demonstration	TBA
July 26	(H) Kidney	Dr. Ed Soltis, PhD-confirmed
July 27	(H) Imaging the Heart	Dr. Joseph Schoepf, MD-confirmed
July 28	(N) Addiction & Alcohol	Dr. Corigan Smothers, PhD-confirmed
July 29	(N) Schizophrenia	Dr. Antonieta Lavin, PhD

Note: Lectures in Black are for all students.
Lectures in Blue are for Cardiovascular track students. (7 lectures)
Lectures in Red are for Cancer track students. (7 lectures)
Lectures in Green are for Neuroscience track students. (8 lectures)
CTSA – (5 lectures)

Conduct Aim 2: Prostate Cancer Research Training (Year 1, months 6-8; Year 2, months 6-8; Year 3, months 6-8)

The Student Fellows participated in an intensive training 10-week program in Prostate Cancer Research. Lectures focused on population science, statistical methods in prostate cancer research, prostate cancer clinical research, and basic science research. Other lectures described funding opportunities available to the students, career development opportunities, qualitative research methods, perspectives of prostate cancer among community members, and tips for preparing graduate school applications. The schedule also provided time for students to rehearse their research presentations and gain input from their mentors and other scientists at the HCC. Disparities research was a cross-cutting theme in all of the lectures.

The structure of the curriculum also seeks to provide the students with a better understanding of the different population groups that were included in their research. Therefore, cultural enrichment activities were added to the curriculum, such as the Gullah tour of Charleston, in order to expose the students to the local and historic culture of the Charleston population. The Sea Island (Gullah) population is a subpopulation of African Americans indigenous to the coastal regions of the eastern seaboard. They are the most genetically homogeneous group of blacks in the U.S. Their particularly low rate of European American genetic admixture makes this a unique population for basic, clinical and population-based research. The following tables show the prostate cancer research training curricula from years 2009-2011.

Prostate Cancer Research Training Course – Summer of 2009			
Week	**Topic**	**Instructor and Organizational Affiliation**	**Location and Time**
Week 1 **Thursday, June 4, 2009**	Introduction to Health Disparities Research	**Rebecca Bullard-Dillard**, **Ph.D**., CU; **Judith Salley**, **Ph.D**., SCSU; **Leroy Davis**, **Ph.D**., VC	HCC Room 121 1:00-2:00pm
Week 2 (Population Science /Epidemiologic Research Lecture) **Tuesday, June 9, 2009**	Vitamin D and Prostate Cancer	**Sebastiano Gattoni-Celli, Ph.D.,** Professor Radiation Oncology	HCC Room 121 1:00-2:00pm
Week 2 (Statistical Methods Lecture) **Thursday, June 11, 2009**	Biostatistical Issues in Prostate Cancer Research	**Elizabeth Garrett-Mayer, Ph.D.,** Director, HCC Statistical Unit, MUSC	HCC Room 121 1:00-2:00pm
Week 3 (Clinical Research Lecture) **Tuesday, June 16, 2009**	Clinical Research Issues in Prostate Cancer: Prostate Cancer Screening Controversies	**Jonathan Picard, PhD**, Assistant Professor, Urology Department, MUSC	HCC Room 121 1:00-2:00pm
Week 3 (Funding Opportunities) **Thursday, June 18, 2009**	Funding Opportunities for Underrepresented Minority Scholars	**Joann F. Sullivan, Ph.D**., Assistant Dean for Extramural Programs, Director of Grants Development, Professor of Libraries and Information Sciences, MUSC	HCC Room 121 1:00-2:00pm
Week 4 (Basic Science Research Lecture) **Tuesday, June 23, 2009**	Velcade for Injection Therapy for Early Relapsed Prostate Cancer	**Andrew S. Kraft**, **M.D.,** HCC Director, MUSC	HCC Room 121 1:00-2:00pm
Week 5 (Basic Science) **Tuesday, June 30, 2009**	TRAIL Gene Therapy of LNCaP Prostate Cancer Cells	**Christina Voelkel-Johnson, Ph.D.,** Assistant Professor, Microbiology & Immunology MUSC	HCC Room 121 1:00-2:00pm
Week 5 (Population Science Lecture) **Thursday, July 2, 2009**	Employing Qualitative Methods in Research	**Gayenell Magwood, Ph.D**., Assistant Professor, College of Nursing, MUSC	HCC Room 121 1:00-2:00pm
Week 6 (Clinical Research Lecture) **Monday, July 6, 2009**	Anatomy and the Function of the Prostate	**Harry S. Clarke, M.D.,** Ph.D., Associate Dean for Graduate Medical Education and Professor, Urology Services, MUSC	HCC Room 124 1:00-2:00pm
Week 6 (Clinical Research Lecture) **Tuesday, July 7, 2009**	Pursuing a Graduate Dual Degree Program	**Gabrielle Cannick, DDS, Ph.D**	HCC Room 121 1:00-2:00pm
Week 6 (Basic Science Research Lecture) **Thursday, July 9, 2009**	Prostate Cancer Research: Perspectives of Community Members	**HCC Cancer Disparities Board Members and Jim Etheredge, MPA** Coordinator, HCC Cancer Disparities Program, MUSC	HCC Room 121 1:00-2:00pm
Week 7 (Basic Science Research Lecture) **Tuesday, July 14, 2009**	The present and future for gene and viral therapy of directly accessible prostate and squamous cell cancers of the head and neck	**Jim Norris, Ph.D.,** Chairperson and Professor, Department of Microbiology and Immunology, MUSC	HCC Room 121 1:00-2:00pm
Week 8 (Population Science Lecture) **Monday, July 20, 2009**	Developing Community Coalitions to Combat Health Disparities	**Mr. David Rivers**, Director of Public Information and Community Outreach and Research Associate, MUSC	HCC Room 121 1:00-2:00pm
Week 8 (Population Science/Epidemiologic Research Lecture) **Wednesday, July 22, 2009**	Epidemiologic Issues in Prostate Cancer Research	**Anthony Alberg, Ph.D.,** HCC Associate Director, Prevention and Control Program, Associate Professor, Biostatistics, Bioinformatics, & Epidemiology, MUSC	HCC Room 121 1:00-2:00pm
Week 9 (Tips for Preparing Graduate School Applications) **Tuesday, July 28, 2009**	Improving Graduate School Admission Rates	**Cynthia F. Wright, Ph.D**., Assistant Dean for Admissions and Associate Professor, College of Graduate Studies, MUSC	HCC Room 121 1:00-2:00pm
Week 9 (Clinical Research Lecture) **Thursday, July 30, 2009**	Clinical Research Issues in Prostate Cancer	**Stephen Savage, M.D**., Associate Professor, Urology Services, MUSC	HCC Room 121 1:00-2:00pm
Week 10 (Rehearsals) **Tuesday, August 4, 2009**	Research Presentation Rehearsals and Evaluations	**All Research Students** **Dr. Marvella Ford**, HCC **Ms. Melanie Sweat,** Program Coordinator	HCC Room 121 1:00-2:00pm
Week 10 (Socialization) **August 6, 2009**	Culminating Luncheon	**Training Program Student Fellows, Mentors, Lecturers, Staff and Family**	HCC Room 121 1:00-2:00pm

Prostate Cancer Research Training Course – Summer of 2010			
Week	**Topic**	**Instructor and Organizational Affiliation**	**Location and Time**
Week 1 **Tuesday, June 8, 2010**	Welcome and Overview	**Marvella E. Ford, Ph.D.**, Associate Director, Cancer Disparities Program, Associate Professor, Department of Medicine, Division of Biostatistics & Epidemiology **Melanie S. Jefferson, MPH**, Program Coordinator, Cancer Disparities Program, HCC	Room 124 1:00-2:00pm
Week 1 (Basic Science Research Lecture) **Wednesday, June 9, 2010**	Overview of the Hollings Cancer Center	**Andrew S. Kraft**, **M.D.,** HCC Director, MUSC	Room 121 1:00-2:00pm
Week 2 **Thursday, June 17, 2010**	Introduction to Health Disparities Research	**Rebecca Bullard-Dillard**, **Ph.D**., CU; **Judith Salley**, **Ph.D**., SCSU; **Leroy Davis**, **Ph.D**., VC	Room 121 1:00-2:00pm
Week 3 (Clinical Research Lecture) **Monday, June 21, 2010**	Anatomy and the Function of the Prostate	**Harry S. Clarke, M.D.,** Ph.D., Associate Dean for Graduate Medical Education and Professor, Urology Services, MUSC	Room 121 3:00-4:00pm
Week 3 (Population Science /Epidemiologic Research Lecture) **Tuesday, June 22, 2010**	Vitamin D and Prostate Cancer	**Sebastiano Gattoni-Celli, M.D.,** Professor Radiation Oncology	Room 121 1:00-2:00pm
Week 3 (Clinical Research Lecture) **Wednesday, June 23, 2010**	Two Part Discussion: • Pursuing a Graduate Dual Degree and • Completing a Residency in Radiation Oncology	**Gabrielle Cannick, DDS, Ph.D** **Leander Cannick, M.D.**, Department of Radiation Oncology, MUSC	Room 121 1:00-2:00pm
Week 4 (Basic Science) **Tuesday, June 29, 2010**	Apoptosis of Prostate Cancer Cells	**Christina Voelkel-Johnson, Ph.D.,** Assistant Professor, Microbiology & Immunology MUSC	Room 121 1:00-2:00pm
Week 4 (Biostatistical Methods Lecture) **Thursday, July 1, 2010**	Biostatistical Issues in Prostate Cancer Research	**Elizabeth Garrett-Mayer, Ph.D.,** Director, HCC Biostatistical Core, Department of Medicine, Division of Biostatistics & Epidemiology	Room 121 1:00-2:00pm
Week 5 (Population Science/Epidemiologic Research Lecture **Tuesday, July 6, 2010**	Epidemiologic Issues in Prostate Cancer Research	**Anthony Alberg, Ph.D.,** HCC Associate Director, Prevention and Control Program, Associate Professor, Department of Medicine Division of Biostatistics & Epidemiology, MUSC	Room 121 1:00-2:00pm
Week 5 (Population Science) **Thursday, July 8, 2010**	Prostate Cancer Research: Perspectives of Community Members	**Debbie Bryant, RN** Cancer Disparities Outreach Efforts, Outreach Coordinator, HCC Cancer Disparities Program, MUSC	Room 121 1:00-2:00pm
Week 6 (Biostatistical Methods Lecture) **Tuesday, July 13, 2010**	Statistical Genetics	**Emily Kistner-Griffin, Ph.D.**, Assistant Professor, Department of Medicine, Division of Biostatistics and Epidemiology	Room 124 1:00-2:00pm
Week 6 (Basic Science Lecture) **Thursday, July 15, 2010**	Developmental Transcription Factors in Prostate Cancer	**Demetri Spyropoulos, Ph.D.**, Associate Professor**,** Pathology & Laboratory Medicine	Room 121 1:00-2:00pm
Week 7 (Population Science Lecture) **Tuesday, July 20, 2010**	Qualitative Research Methods	**Charlene Pope, Ph.D**., Associate Professor, College of Nursing, MUSC	Room 121 1:00-2:00pm
Week 8 (Population Science Research Lecture) **Tuesday, July 27, 2010**	Lunch and Lecture	**Dr. Marvella E. Ford,** Cancer Disparities Program	Room 121 1:00-2:00pm
Week 8 (Population Science Lecture) **Thursday, July 29, 2010**	Project Sugar: Community-based genetic research project among the Sea Islanders (Gullahs) in SC	**Ida J. Spruill, Ph.D.**, Assistant Professor, College of Nursing, MUSC	Room 121 12:30-1:30pm
Week 9 (Tips for Preparing Graduate School Applications) **Tuesday, August 3, 2010**	Improving Graduate School Admission Rates	**Cynthia F. Wright, Ph.D**., Assistant Dean for Admissions and Associate Professor, College of Graduate Studies, MUSC	Room 121 1:00-2:00pm

Prostate Cancer Research Training Course – Summer of 2010 (Continued)			
Week	**Topic**	**Instructor and Organizational Affiliation**	**Location and Time**
Week 9 (Rehearsals) **Thursday, August 5, 2010**	Research Presentation Rehearsals and Evaluations	**All Research Students** **Dr. Marvella Ford**, HCC **Ms. Melanie Sweat,** Program Coordinator	Room 121 1:00-2:00pm
Week 10 (Rehearsals and Evaluations) **Tuesday, August 9, 2010**	Research Presentation Rehearsals and Evaluations	**All Research Students** **Marvella Ford**, **Ph.D** **Melanie S. Jefferson**	TBD

Prostate Cancer Research Training Course – Summer of 2011			
Week	**Topic**	**Instructor and Organizational Affiliation**	**Location and Time**
Tuesday, June 7, 2011 (Overview Kick-Off Lecture)	Welcome and Overview of the Training Program	**Melanie Jefferson**, Program Coordinator **Debbie Bryant**, CPC Assistant Director **Jim Etheredge**, Program Coordinator **Tonya Hazelton & Betty Rouse**, Administrative Coordinators	**Room 121** **1:00-2:00pm**
Wednesday, June 8, 2011 (Clinical Research Lecture)	Reception and Overview of the Hollings Cancer Center	**Carolyn E. Reed**, **M.D.,** Endowed Chair, Alice Ruth Reeves Folk for Clinical Oncology; Professor **Marvella E. Ford, PhD**., Associate Director, Cancer Disparities Program	**Room 120** **2:00-3:00pm**
Monday, June 13, 2011 (Clinical Research Lecture)	Anatomy and the Function of the Prostate	**Harry S. Clarke, M.D.,** Ph.D., Associate Dean for Graduate Medical Education and Professor, Urology Services, MUSC	**Room 124** **3:00-4:00pm**
Tuesday, June 14, 2011 (Population Science Research Lecture)	Health Disparities in Clinical Encounters: Mechanisms and Solutions	**Leonard Egede, M.D.,** Director, MUSC Center for Research on Health Disparities	**Room 121** **1:00-2:00pm**
Wednesday, June 15, 2011	**Mobile Health Unit (MHU) Tour: Campus-Wide Employee Screenings BSB**		
Tuesday, June 21, 2011 (Population Science Research Lecture)	Prostate Cancer Research: Perspectives of Community Members	**Jim Etheredge and Cancer Disparities Board Members**, HCC Cancer Disparities Program, MUSC	**Room 121** **1:00-2:00pm**
Thursday, June 23, 2011 (Population Science Research Lecture)	Roundtable Discussion: Pursuing a Graduate Dual Degree and Completing a Residency in Radiation Oncology	**Gabrielle Cannick, DDS, Ph.D** **Leander Cannick, M.D.**, Department of Radiation Oncology, MUSC	**Room 124** **1:00-2:00pm**
Tuesday, June 28, 2011 (Academic Planning Lecture)	Funding Opportunities for Underrepresented Minority Scholars	**Joann F. Sullivan, Ph.D.,** Assistant Dean for Extramural Programs, Director of Research Development, Professor of Libraries and Information Sciences, MUSC	**Room 121** **1:00-2:00pm**
Thursday, June 30, 2011 (Biostatistical Methods Lecture)	Biostatistical Issues in Prostate Cancer Research	**Elizabeth Garrett-Mayer, Ph.D.,** Director, HCC Biostatistical Core, Department of Medicine, Division of Biostatistics & Epidemiology	**Room 121** **1:00-2:00pm**
Tuesday, July 5, 2011	**Cultural Enrichment: Gullah Tour Of Charleston**		
Wednesday, July 6, 2011 (Population Science Research Lecture)	Project Sugar: Community-based genetic research project among the Sea Islanders (Gullahs) in South Carolina	**Ida J. Spruill, Ph.D.**, Assistant Professor, College of Nursing, MUSC	**Room 124** **1:00-2:00pm**
Thursday, July 7, 2011 (Basic Science Lecture)	Developmental Transcription Factors in Prostate Cancer	**Demetri Spyropoulos, Ph.D.**, Associate Professor**,** Pathology & Laboratory Medicine	**Room 121** **1:00-2:00pm**
Community Service: MHU Skin Cancer Screenings - Isle of Palms Beach 9:00-12:00pm			
Tuesday, July 12, 2011 (Population Science/Epidemiologic Research Lecture	Epidemiologic Issues in Prostate Cancer Research	**Anthony Alberg, Ph.D.,** HCC Associate Director, Prevention and Control Program, Associate Professor, Department of Medicine Division of Biostatistics & Epidemiology, MUSC	**Room 121** **1:00-2:00pm**
Thursday, July 14, 2011 (Population Science Lecture)	Qualitative Research Methods	**Charlene Pope, Ph.D**., Associate Professor, College of Nursing, MUSC	**Room 121** **1:00-2:00pm**
Tuesday, July 19, 2011 (Clinical Research Lecture)	The present and future for gene and viral therapy	**Jim Norris, Ph.D**., Chairperson and Professor, Department of Microbiology and Immunology, MUSC	**Room 124** **1:00-2:00pm**
Thursday, July 21, 2011 (Clinical Research Lecture)	Vitamin D and Prostate Cancer	**Sebastiano Gattoni-Celli, M.D.,** Professor Radiation Oncology	**Room 124** **1:00-2:00pm**
Tuesday, July 26, 2011 (Tips for Preparing Graduate School Applications)	Improving Graduate School Admission Rates	**Cynthia F. Wright, Ph.D**., Assistant Dean for Admissions and Associate Professor, College of Graduate Studies, MUSC	**Room 121** **1:00-2:00pm**
Thursday, July 28, 2011 (Rehearsals)	Research Presentation Rehearsals	**All Research Students and mentors**	**Room 124** **1:00-2:00pm**
Tuesday, August 2, 2011 (Rehearsals)	Research Presentation Rehearsals	**All Research Students and mentors**	**Room 121** **1:00-2:00pm**
Thursday, August 4, 2010 (Rehearsals and Evaluations)	Celebratory Luncheon and Rehearsals and Evaluations	**All Research Students, Mentors, Staff**	**Room 121** **1:00-2:00pm**

***(c)* Sponsor the Student Fellows' Participation in a Graduate Record Examination (GRE) course (Year 1, months 6-8; Year 2, months 6-8; Year 3, months 6-8)**

In 2009, all four Student Fellows took the 8-week Kaplan GRE Test Preparation Course. The 2009 course schedule description is detailed below.

2009 KAPLAN GRE TEST PREPARATION COURSE			
SESSION	**DAY**	**DATE**	**TIME**
Session 1: Diagnostic Exam & Orientation	Tuesday	June 09, 2009	6:00 PM -8:30 PM
Session 2: Introduction to Math Strategies	Tuesday	June 16, 2009	6:00 PM -8:30 PM
Session 3: Strategic Short Verbal	Tuesday	June 23, 2009	6:00 PM -8:30 PM
Session 4: Arithmetic & Number Properties	Tuesday	June 30, 2009	6:00 PM -8:30 PM
Session 5: Reading I & Issue Essays	Tuesday	July 07, 2009	6:00 PM -8:30 PM
Session 6: Algebra & Data Interpretation	Tuesday	July 14, 2009	6:00 PM -8:30 PM
Session 7: Vocabulary & Short Verbal	Tuesday	July 21, 2009	6:00 PM -8:30 PM
Session 8: Proportions & Geometry	Tuesday	July 28, 2009	6:00 PM -8:30 PM
Session 9: Reading II & Argument Essays	Tuesday	August 04, 2009	6:00 PM -8:30 PM

In 2010, all four Student Fellows took the 8-week Kaplan GRE Test Preparation Course. The 2010 course schedule description is detailed below.

2010 KAPLAN GRE TEST PREPARATION COURSE			
SESSION	**DAY**	**DATE**	**TIME**
Session 1: Diagnostic Exam & Orientation	Tuesday	June 8, 2010	6:00 PM -8:30 PM
Session 2: Intro to Math Strategies	Tuesday	June 15, 2010	6:00 PM -8:30 PM
Session 3: Strategic Short Verbal	Tuesday	June 22, 2010	6:00 PM -8:30 PM
Session 4: Arithmetic & Number Properties	Tuesday	June 29, 2010	6:00 PM -8:30 PM
Session 5: Reading I & Issue Essays	Tuesday	July 6, 2010	6:00 PM -8:30 PM
Session 6: Algebra & Data Interpretation	Tuesday	July 13, 2010	6:00 PM -8:30 PM
Session 7: Vocab & Short Verbal	Tuesday	July 20, 2010	6:00 PM -8:30 PM
Session 8: Proportions & Geometry	Tuesday	July 27, 2010	6:00 PM -8:30 PM
Session 9: Reading II & Argument Essays	Tuesday	August 3, 2010	6:00 PM -8:30 PM

In 2011, all four Student Fellows took the 9-week Princeton Review GRE Test Preparation Course. The 2011 course schedule description is provided below.

2011 PRINCETON REVIEW COURSE SCHEDULE			
SESSION	**DAY**	**DATE**	**TIME**
Session 1: Diagnostic Exam & Orientation	Wednesday	June 8, 2010	5:30-8:30PM
Session 2: Intro to Math Strategies	Wednesday	June 15, 2010	5:30-8:30PM
Session 3: Strategic Short Verbal	Wednesday	June 22, 2010	5:30-8:30PM
Session 4: Arithmetic & Number Properties	Wednesday	June 29, 2010	5:30-8:30PM
Session 5: Reading I & Issue Essays	Wednesday	July 6, 2010	5:30-8:30PM
Session 6: Algebra & Data Interpretation	Wednesday	July 13, 2010	5:30-8:30PM
Session 7: Vocab & Short Verbal	Wednesday	July 20, 2010	5:30-8:30PM
Session 8: Proportions & Geometry	Wednesday	July 27, 2010	5:30-8:30PM
Session 9: Reading II & Argument Essays	Wednesday	August 3, 2010	5:30-8:30PM

(d) Invite former Student Fellows who have not yet graduated to participate in ongoing prostate cancer research activities (e.g., scientific seminars, journal clubs, etc.) at the Medical University of South Carolina (MUSC) Hollings Cancer Center through videoconferencing. (Years 2, 3, and beyond)

With the no-cost extension approval, equipment that allowed students from SCSU to participate in the summer curriculum lectures via videoconference. To enhance the year-round interaction with the Student Fellows, they will also be invited to participate in the HCC Cancer Prevention and Control seminars as well as other HCC research seminars.

Task 2 Deliverables: From 2009-2012, state-of-the art comprehensive prostate cancer research education and training opportunities were provided for **12** students from two of South Carolina's HBCUs. We developed a cadre of scientists who are were-prepared to play a significant role in discovering and testing new prostate cancer biomarkers. In the future, these investigators will likely conduct research spanning the continuum from basic science to clinical science to population-based research.

Task 3. Prepare Tangible Scientific Products

(*a*) Prepare and present scientific abstracts based on the Student Fellows' prostate cancer research (Year 1, months 10-12, Year 2, months 1-12, Year 3, months 1-12)

***(b*) Prepare manuscripts that will be submitted to peer-reviewed journals (Year 1, months 10-12, Year 2, months 1-12, Year 3, months 1-12)**

***(c)* Develop manuscripts to describe the scope and outcomes of the project (Year 3, months 9-12)**

In 2009, each Student Fellow prepared a scientific research paper that will form the basis of a peer-reviewed publication. The Student Fellows are completing manuscripts with their research mentors. Each Student Fellow gave a scientific presentation based on the results of his or her work.

In 2010, each Student Fellow prepared a scientific research paper that will form the basis of a peer-reviewed publication. The Student Fellows are completing manuscripts with their research mentors and each Student Fellow gave a scientific presentation based on the results of his or her work. In addition, one Student Fellow, Ebonie Fuller, was selected to give an oral presentation of her summer research project during MUSC's Annual Perry V. Halushka MUSC Student Research Day on November 5, 2010. All four Student Fellows had abstracts accepted for poster presentation at the DOD-sponsored Innovative Minds in Prostate Cancer Today (IMPaCT) Conference (plus an additional two Student Fellows from the Summer of 2009). An abstract describing the overall program was also accepted for poster presentation at the conference. **Appendix A** includes the abstracts that were presented by the Student Fellows and the Program Director and Associate Directors during the IMPaCT Conference.

In 2011, each Student Fellow gave a scientific presentation based on the results of his or her work. In addition, one Student Fellow, Jazzmine Clemons, was selected to give an oral presentation of her summer research project during MUSC's Annual Perry V. Halushka MUSC Student Research Day on November 4, 2011. Three of the four students (plus an additional Student Fellow, CoDanielle Green, summer of 2009) had abstracts accepted for poster presentation at the Fifth Annual National Conference on Health Disparities in Charleston, SC on November 30, 2011. Mr. Kendrick Henderson had his abstract accepted for poster presentation at the 2011 Annual Biomedical Research Conference for Minority Students held in St. Louis, Missouri, November 9-12, 2011. Summaries of each Student Fellows' research projects are included in **Appendix B**. A manuscript describing the scope and outcomes of the Training Program will be initiated in the spring of 2013.

Deliverables: A total of 42 scientific presentations were made by the Student Fellows, including two presentations that were made at national scientific meetings.

Task 4. Evaluate the Training Program

(a) **Assess the number of applicants to the Training Program (Year 1, months 1-4, year 2, months 1-4, Year 3, months 1-4)**

As planned, 12 Student Fellows enrolled in the Training Program in the summers of 2009-2011.

(b) **Assess the number of Student Fellows who apply to graduate school (Year 2, months 1-12, Year 3, months 1-12)**

The majority of Student Fellows have taken the GRE and have been accepted to graduate/professional school (n=5) or are in the process of applying (n=7) as they complete their junior and senior years of college.

(c) **Assess the number of Student Fellows who are admitted to graduate school (Year 2, months 1-12, Year 3, months 1-12) and *(d)* Assess the number of graduate schools to which Student Fellows are admitted (Year 2, months 1-12, Year 3, months 1-12)**

We are actively keeping track of the progress of the Student Fellows.

(e) **Employ several tracking mechanisms to monitor the scientific progress of the students, including:**

1. **Searching the MUSC graduate program databases to identify whether any of the students applied, were offered, or accepted positions at MUSC.**
2. **Contacting the participating universities' alumni offices.**

3. **Employing other internet based search tools/communications (Google, MySpace, Facebook, and Historically Black College/University Connections, etc.) to identify students' current locations, contact information, and academic achievements (Years 2, 3, and beyond)**

We have implemented several steps for tracking student scientific progress. Communication and assistance from the Associate Directors and Faculty Advisors have proved to be very effective. Additionally, social media tools such as Facebook have also been useful for engaging the students and opening a venue for communication. Another method we have found useful is text messaging. We have found that students respond more quickly to text messages than to emails and telephone calls. We will utilize and build upon these methods to improve continued student tracking.

These multiple tracking strategies were used to prepare the table that is included in **Appendix C**, which lists the academic accomplishments of the Student Fellows from 2009-2012.

(f) **Identify the number of scientific abstracts presented and peer-reviewed publications that result (Year 1, months 10-12, Year 2, months 1-12, Year 3, months 1-12)**

The Student Fellows gave a total of 42 scientific presentations, including presentations at national scientific meetings such as the DOD-sponsored IMPaCT meeting in March 2010 and the Fifth Annual National Conference on Health Disparities in Charleston, SC in November 2011. The following data shows the peer-reviewed scientific publications on which the Student Fellows are included as co-authors.

- Norell H, Martins da Palma T, Lesher A, Kaur N, Mehrotra M, Naga OS, Spivey N, **Olafimihan S,** Chakraborty NG, Voelkel-Johnson C, Nishimura MI, Mukherji B, Mehrotra S. Inhibition of superoxide generation upon T-cell receptor engagement rescues Mart-1(27-35)-reactive T cells from activation-induced cell death. Cancer Res. 2009 Aug 1;69(15):6282-9. Epub 2009 Jul 28.
- Mack JT, Helke KL, Normand G, **Green C,** Townsend DM, Tew KD. ABCA2 transporter deficiency reduces incidence of TRAMP prostate tumor metastasis and cellular chemotactic migration. Cancer Letters 2011; 300(2): 154 -161.
- Ford ME, Wahlquist AH, Blake R, **Green C,** Streets J, **Fuller EM,** Johnson ER, Jefferson MS, Etheredge JW, Varner H, Johnson S, Glover SH, Turner DP, Garrett-Mayer E. Assessing an intervention to improve clinical trial perceptions among predominantly African American communities in South Carolina. Progress in Community Health Partnerships: Research Education and Action 2012; 6:249-63. PubMed PMID: 22982839.

Deliverables: Ten of the students have applied to graduate or professional schools and five were accepted. The others are completing their junior or senior years of college and are continuing to apply to graduate or professional schools. The Student Fellows gave a total of 42 scientific presentations, including those that were made at two national scientific meetings. Also, each year, we asked the Student Fellows to evaluate the Training Program. The results are presented in the following tables.

2009 SUMMARY RESULTS OF STUDENT EVALUATIONS (N=6*)									
Survey Item	**Total Strongly Disagree**		**Total Disagree**		**Total Not Sure**		**Total Agree**		**Total Strongly Agree**	
	(N	**%)**	**(N**	**%)**	**(N**	**%)**	**(N**	**%)**	**(N**	**%)**
1. Overall, the summer program was a good research experience.	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**4**	**0.67**	**2**	**0.33**
2. The summer program helped me learn the fundamentals of prostate cancer and research.	**0**	**0.0**	**1**	**0.20**	**0**	**0.0**	**0**	**0.0**	**4**	**0.80**
3. The KAPLAN Graduate Record Examination (GRE) Course was effective in helping me to learn GRE test preparation strategies.	**0**	**0.0**	**0**	**0.0**	**2**	**0.33**	**3**	**0.50**	**1**	**0.17**
4. The seminar schedule was convenient.	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**4**	**0.67**	**2**	**0.33**
5. The seminar topics were of interest to me.	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**4**	**0.67**	**2**	**0.33**
6. Participating in the program helped to strengthen my desire for a career in cancer research.	**0**	**0.0**	**0**	**0.0**	**3**	**0.50**	**3**	**0.50**	**0**	**0.0**
7. The Program Director (Dr. Ford) was accessible and assisted me when needed.	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**3**	**0.50**	**3**	**0.50**
8. The Program Coordinator (Ms. Sweat) was accessible and assisted me when needed.	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**1**	**0.17**	**5**	**0.83**
9. My research mentor was accessible and assisted me when needed.	**0**	**0.0**	**0**	**0.0**	**1**	**0.17**	**2**	**0.33**	**3**	**0.50**
10. I would recommend this program to other students at my college/university.	**0**	**0.0**	**1**	**0.17**	**0**	**0.0**	**4**	**0.67**	**1**	**0.17**

*N includes 2 students who were supported via another funding mechanism.

2010 SUMMARY RESULTS OF STUDENT EVALUATIONS (N=4)									
	Strongly Disagree		Disagree		Not Sure		Agree		Strongly Agree	
Survey Item	(N	%)	(N	%)	(N	%)	(N	%)	(N	%)
1. Overall, the summer program was a good research experience.	0	0.0	0	0.0	0	0.0	1	25.0	3	75.0
2. The summer program helped me learn the fundamentals of prostate cancer and research.	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0
3. The KAPLAN Graduate Record Examination (GRE) Course was effective in helping me to learn GRE test preparation strategies.	0	0.0	0	0.0	1	0.25	3	0.75	0	0.0
4. The seminar schedule was convenient.	0	0.0	0	0.0	0	0.0	2	0.50	2	0.50
5. The seminar topics were of interest to me.	0	0.0	0	0.0	0	0.0	3	0.75	1	0.25
6. Participating in the program helped to strengthen my desire for a career in cancer research.	0	0.0	0	0.0	0	0.0	1	0.25	3	0.75
7. The Program Director (Dr. Ford) was accessible and assisted me when needed.	0	0.0	0	0.0	0	0.0	1	0.25	3	0.75
8. The Program Coordinator (Ms. Sweat) was accessible and assisted me when needed.	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0
9. My research mentor was accessible and assisted me when needed.	0	0.0	0	0.0	0	0.0	1	0.25	3	0.75
10. I would recommend this program to other students at my college/university.	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0

2011 SUMMARY RESULTS OF STUDENT EVALUATIONS (N=4)									
	Strongly Disagree		Disagree		Not Sure		Agree		Strongly Agree	
Survey Item	(N	%)	(N	%)	(N	%)	(N	%)	(N	%)
1. Overall, the summer program was a good research experience.	0	0.0	0	0.0	0	0.0	1	25.0	3	75.0
2. The summer program helped me learn the fundamentals of prostate cancer and research.	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0
3. The Princeton Review Graduate Record Examination (GRE) Course was effective in helping me to learn GRE test preparation strategies.	0	0.0	0	0.0	1	0.25	1	0.25	3	0.75
4. The seminar schedule was convenient.	0	0.0	0	0.0	0	0.0	2	0.50	2	0.50
5. The seminar topics were of interest to me.	0	0.0	0	0.0	1	0.25	2	0.50	1	0.25
6. Participating in the program helped to strengthen my desire for a career in cancer research.	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0
7. The Program Director (Dr. Ford) was accessible and assisted me when needed.	0	0.0	0	0.0	0	0.0	0	0.0	3	100.0
8. The Program Coordinator (Ms. Jefferson) was accessible and assisted me when needed.	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0
9. My research mentor was accessible and assisted me when needed.	0	0.0	1	0.25	0	0.0	0	0.0	3	0.75
10. I would recommend this program to other students at my college/university.	0	0.0	0	0.0	0	0.0	1	0.25	3	0.75

REPORTABLE OUTCOMES

Student Summer Research Summaries

Each Student Fellow prepared a research paper and gave a scientific presentation to their peers, mentors and other faculty at MUSC. Details regarding the manuscripts and scientific presentations developed by the Student Fellows are included in **Appendix C**.

CONCLUSIONS

During the three years of funding of the DOD Collaborative Undergraduate HBCU Summer Prostate Cancer Training Program, the tasks outlined in the Statement of Work were successfully met. Twelve Student Fellows were recruited from Claflin University, SC State University, and Voorhees College. Each Student Fellow conducted research and prepared a research paper that was presented at the conclusion of the program. The Student Fellows also presented their work at national conferences and were included as co-authors on peer-reviewed scientific publications, based on their summer research.

As shown in the following tables, four additional students participated in the DOD Collaborative Undergraduate HBCU Summer Prostate Cancer Training Program using funds leveraged from another DOD grant that was funded in 2010 (DOD Grant Number W81XWH-10-2-0057, Southeastern Virtual Institute for Health Equity and Wellness). The DOD SE VIEW grant provided funding for two additional students per year beginning in 2010.

2010 DOD SE VIEW Grant Funded Students				
Student's Name	**Institution**	**MUSC Research Mentor**	**Research Title**	**Research Summary**
Janielle Samuel	Voorhees College	Dr. Marvella E. Ford	Testing protein glutathionylation levels In MCF7 breast cancer cells expressing glutathione S-transferase Pi Isoforms	GSTpi has been implicated in the forward reaction of S-glutathionylation. Therefore, we are interested in understanding how polymorphism may alter cellular responses for both oxidative and nitrosative stress. As such, the four alleles of GSTpi have been transfected into MCF7 breast cancer cells and we are testing the rate and extend the S-Glutathionylation via western blot analysis.
Edward McMorris	Voorhees College	Dr. Christina Voelkel-Johnson	Acid ceramidase overexpression and its role in the activation of and addiction to Akt signaling in prostate cancer	Previous studies have demonstrated the role of the ceramide metabolizing enzyme acid ceramidase in promoting an aggressive cancer phenotype in prostate cancer cell lines. In addition, it has been found that greater than 80% of prostate tumors overexpress acid ceramidase, suggesting that acid ceramidase may be an important mediator of development and progression of prostate cancer. In this study, we demonstrate that the increased rate of proliferation in acid ceramidase overexpressing cells is dependent on signaling through the oncogenic PI3K/Akt pathway. In addition, we found that acid ceramidase overexpressing cells are more sensitive to Akt inhibition than control cells, suggesting that acid ceramidase overexpressing tumors are addicted to Akt signaling. These findings highlight the importance of investigating the Akt pathway as a potential therapeutic target in acid ceramidase overexpressing tumors.

2011 DOD SE VIEW Grant Funded Students (Continued)				
Student's Name	**Institution**	**MUSC Research Mentor**	**Research Title**	**Research Summary**
CoDanielle Green	SC State University	Dr. Marvella E. Ford	Evaluating an intervention to increase cancer knowledge in racially diverse communities in South Carolina; as well as, the increase in cancer knowledge's effect on cancer prevention activities.	To conduct a cancer education intervention with racially diverse communities in South Carolina. Then, to assess the impact that the cancer knowledge intervention is having on the cancer prevention activities of the residents.
De'Angelo Dinkins	SC State University	Dr. Christina Voelkel-Johnson	Thioredoxin 1 as a Therapeutic Target in Advanced Prostate Cancer	Prostate cancer is the 2nd leading cancer in men after lung cancer. Indolent disease can be treated fairly well and progresses slowly. However, the more aggressive form of prostate cancer spreads though out the body and there are no curative treatments. We tested the hypothesis that increased expression of redox proteins is an underlying cause for the aggressive, therapy-resistant prostate cancer phenotype. In our project we looked at the expression of redox proteins and susceptibility to chemotherapy in ARCaPe and ARCaPm cells.

Appendix A
DOD IMPaCT Conference Abstracts

Jonathan Brown
Claflin University

ABSTRACT

NOV-002 Induces S-Glutathionylation of Serpin A1 and A3 in Human Plasma

Introduction: Serine protease inhibitors (serpins) make up about 2% of the total protein in human serum. Serpins have been found to undergo post-translational modification, S-glutathionylation, in patients treated with redox chemotherapeutics. S-glutathionylation is the specific posttranslational modification of protein cysteine residues by the addition of glutathione. S-glutathionylation alters the functionality of enzymes, receptors, structural proteins, transcription factors, and transport proteins.

Methods: The methods evaluated the effects of the redox chemotherapeutics on the S-glutathionylation of serpins. NOV-002 is the redox chemotherapeutics utilized to cause serpin A1 and A3 to glutathionylate in treated serum. After receiving the redox chemotherapeutics, glutathionylated Serpin A1 and A3 were used to analyze myeloproliferative events. Protein electrophoresis and Western blot analysis were utilized to test glutathionylation. Glutathionylation of serpin A1 and A3 proteins was measured before and after the addition of the drug NOV-002 to serum samples of cancer patients.

Results: According to the Western blot analyses, the glutathionylation patterns in both blots illustrated that glutathionylation was increased in the plasma samples that were treated with NOV-002. On the contrary, the plasma samples that were not treated with NOV-002 had less glutathionylation patterns compared to those that were treated with the drug. This western blot that was done on the serpin group, Serpin A1 illustrated that Serpin A1 were found in all of the eight plasma samples taken from cancer patients and were S-glutathionylated.

Conclusion: The results revealed that cancer patients have different Serpin A1 and A3 glutathionylation amounts after receiving the NOV-002 treatment. This supports our hypothesis that S-glutathionylation of serpins occur after receiving the chemotherapeutic or drug, NOV-002.

Impact: The results of this study could lead to improved hematopoietic cell mobilization in bone marrow cells, which could lead to significant increases in white blood cell counts in cancer patients. Currently, many cancer patients experience low white blood cell counts following receipt of chemotherapy.

Scharan Clarke
Claflin University

ABSTRACT

What Factors Can Predict the Success of Sacroneuromodulation When Used in Patients with Urinary Retention?

Introduction: Urinary retention issues are a side effect of some types of prostate cancer treatment. Sacroneuromodulation has been used for both detrusor over-activity and urinary retention. The exact mechanism of action is not known for this therapy. We sought to determine pre-operative factors that could predict good clinical outcomes in the setting of urinary retention.

Methods: We performed a retrospective chart review of procedures performed by three dedicated voiding dysfunction specialists from years 2000-2010. Characteristics evaluated included patient's age, previous surgeries, neurologic diagnosis, length of retention, invasive and noninvasive urodynamic data. Operative data collected included presence of bellows response, sacral foramen used, number of leads, number of electrodes generating a response, side of lead, and complications. Postoperative data included subjective and objective improvement, progression to IPG implantation, wound infection, complications and need for revision.

Results: We identified 54 patients who underwent 73 sacroneuromodulation lead placements as treatment for urinary retention. Seventeen of the 54 patients were males and 35 were females. Their mean age was 50 years. Twenty-seven patients had data on length of retention with a mean of 34 months. Twenty-four patients had undergone previous surgery and 18 were on medical management. All patients underwent urodynamic testing and demonstrated little or no detrusor contraction low flows and elevated post void residuals (PVR). Mean detrusor pressure was 12.5cm/H2O, mean flow rate was 4cc/sec and mean PVR was 593cc. Only 3 patients presented with a neurologic diagnosis. All 73 lead placements demonstrated a good bellows response. Thirty-six leads were placed in the left and 36 on the right; one was not recorded. Bilateral stimulation was tested in 67 patients. A mean of 2.4 electrodes generated a response after lead implantation. Subjective improvement was noted after 48 lead placements and 47 went on to implantable pulse generators (IPG). Twenty six lead placement procedures did not go on to IPG. When comparing the procedures that failed to go on to IPG verses those that did we found few differences. The mean age was higher in the failure group 55 vs. 43years. Mean PVR was also found be higher in the failure group 613cc verses 570cc. No difference was noted in mean flow rate, max detrusor pressure, or number of stimulating electrodes.

Conclusions: The pre-operative and intra-operative factors we evaluated do not appear to give us significant prognostic data. The mechanism of action of sacroneuromodulation lead placements and the factors that may portend its success have yet to be fully defined.

Impact: This study described a potential solution to treating urinary voiding dysfunction, which is a side effect of prostate cancer treatment that has a significant negative impact on quality of life. Electrical impulses through neuromodulation have been theorized to help patients with urinary retention and urinary incontinence by restoring control of the detrusor and sphincter muscles. The findings from this study show that further clinical investigation into the mechanism of sacroneuromodulation lead placements is warranted.

De'Angelo Dinkins
SC State University

ABSTRACT

Redox Protein Expression and Susceptibility to Therapeutic Intervention in ARCaP Prostate Cancer Cells

Background: Prostate cancer is the 2nd leading cancer in men after lung cancer. Thioredoxin is a redox-regulating protein that plays a central role in regulating cellular redox and preventing cell death in prostate cancer. There is a high expression of thioredoxin in prostate cancer cells because the tumor environment is usually under either oxidative or hypoxic stress and both stresses are known to be up-regulators of thioredoxin expression. Indolent disease can be treated fairly well and progresses slowly. However, the more aggressive form of prostate cancer spreads throughout the body and there are no curative treatments.

Hypothesis: We tested the hypothesis that increased expression of redox proteins is an underlying cause for the aggressive, therapy-resistant prostate cancer phenotype.

Methods: In our project we looked at the expression of redox proteins and susceptibility to chemotherapy in ARCaPe and ARCaPm cells. Using western blot methods and Image J we were able to quantify the expression of thioredoxins. Susceptibility to chemotherapy was tested in a viability assay.

Results: Western blot analysis indicated increased expression of the redox proteins such thioredoxin 1 and thioredoxin 2 in ARCaPm cells when compared to ARCaPe cells. Our results conclusively showed that Taxol killed both cell types, while Depsipeptide proved effective on ARCaPe cells and ineffective on the ARCaPm cells. We are currently determining the effect of combination therapies.

Conclusions: In conclusion we found that ARCaPm cells do have an increased expression of redox proteins. Therefore they are more resistant to cancer treatments, such as depsipeptide.

Impact: The results lend evidence for possible combination therapies to effectively treat aggressive prostate cancer phenotypes. Thus, the study results could potentially lead to improved clinical treatment for aggressive prostate cancer, which currently has extremely poor prognostic outcomes.

Ebonie Fuller
SC State University

ABSTRACT

Evaluating an Intervention to Improve Perceptions of Cancer Clinical Trials among Racially Diverse Communities in South Carolina

Objective: To conduct a cancer clinical trials education intervention with racially diverse groups in South Carolina.

Methods: The study was conducted at ten different sites in eight counties in South Carolina. The intervention consisted of a 30-minute cancer clinical trial educational presentation. Participants were recruited primarily by community partners. Pre- and post-intervention surveys were administered. The survey instrument included seven items. Sample items included the following: "Do you think that patients should be asked to take part in medical research?" and "Would you be prepared to take part in a study where treatment was chosen at random?" Analyses were completed using SPSS 16.0, SAS 9.1.3, and R v2.6.1.

Results: The study sample consisted of 195 predominantly African American participants (n=195). One hundred and ninety participants reported their age and most were 50+ years (57.4%). Among those who reported income (n=182), 66.6% had an annual household income < $60,000. For each of the seven survey items assessing perceptions of cancer clinical trials, respectively, 9%, 24%, 38%, 20%, 18%, 14% and 13% of the participants changed to more favorable responses on the post-test vs. pre-test ($p<0.001$).

Conclusions: Providing cancer clinical trials information to racial and ethnic minorities led to more positive perceptions of cancer clinical trials. Future research studies could incorporate a longer follow-up period to assess the behavioral impact of the intervention and whether short-term gains are sustained over time.

Impact: Despite their higher incidence and mortality of cancer relative to their European American counterparts, African Americans are not well represented in cancer clinical trials. The intervention that we tested led to more favorable perceptions of clinical trials in a predominantly underrepresented population. Future studies could evaluate whether the significant and positive changes in perceptions of clinical trials translate into higher rates of clinical trials enrollment.

Andrea Gibson
Claflin University

ABSTRACT

Enhancing Gene Delivery to Cancer Cells

Background: Adenoviral delivery to cancerous cells has potential as a new therapy but is also problematic. Many cancer cells lack coxsackie and adenovirus receptor (CAR) which serves as the transduction factor for an adenovirus to enter a cell. HDACi and polymers have been proven to enhance the transduction of an adenovirus.

Objective: This study involved the investigation of a cell line of prostate cancer cells that infects poorly and to test if HDACi or the polymer EGDE-3, 3' will increase the infectivity of the cell line.

Methods: Infectivity and transgene expression was measured by using flow cytometry following exposure to an adenovirus that expresses green fluoresecent proteins. From this, the percentage of cells that were GFP positive were calculated. GFP intensity was determined from this as well.

Results: The results indicated that HDACi increased infectivity in the prostate cancer cells more than 5-fold at MOI's below 10. However EDGE-3, 3' did not increase infectivity.

Conclusions: EDGE-3, 3' did not work as well as it did in a previous study using bladder cancer cells. However, there was an increase when HDACi were used along with AdGFP. There was also a notable increase of infectivity in the cells that were treated with AdGFP and depsispeptide. Therefore, HDACi may have been more suitable for enhancing adenoviral transgene expression in prostate cancer cells.

Impact: Adenoviruses have the potential to be genetically modified and used in gene therapy to treat diseases such as prostate cancer. Favorable outcomes were seen when HDACi were in conjunction with AdGFP. Further studies are needed to test the effectiveness of this treatment.

CoDanielle Greene
SC State University

ABSTRACT

Role of ABCA2 in Prostate Tumor Progression

Background: Prostate cancer is responsible for an estimated 33% of all newly diagnosed cancers in men. Unfortunately, prostate cancer tumors do not always respond to chemotherapy treatment. Therefore, determining what causes the tumors to become resistant is important to efficiently treat the cancer.

Objective: This study involved determining the role of ABCA2 expression and its association with resistance to chemotherapy and multi-drugs. Therefore the study aimed to determine whether ABCA2 is correlated with tumor progression and to determine whether ABCA2 has an effect on the grade of prostate tumors and instances of metastasis.

Methods: To examine the objectives, a knockout line was created using the Transgenic Adenocarcinoma of Mouse Prostate (TRAMP) model and compared to wild types by various methods including: Western Blotting Analysis, PCR, MRI imaging, Vimentin and Desmin analyses, Scratch Assays, and Transient Transfections.

Results: The ABCA2 expression of Vimentin was found to be elevated in TRAMP prostatic epithelia when viewing the sample slides. In the dorsal prostate, ABCA2 expression in dorsal prostate was also elevated in TRAMP compared to WT mice; expression increases over time/progression. Increased oxidative stress markers were in KO TRAMP tissue. Proliferation of prostatic & SV lesions was similar in WT and KO TRAMP tissues. There was a slight elevation of ROS/RNS-induced DNA damage in KO TRAMP prostate epithelia and elevated ROS/RNS-induced 4-hydroxynonenal modified proteins. Seminal vesicle volume was greater in KO TRAMP mice at 20 weeks. Furthermore, normal stroma of KO TRAMP mice had elevated vimentin expression. No change occurred in the expression of desmin, a myocytic marker of stromal cells.

Conclusions: Although prostate tumor progression was similar in both lines, the instances of metastasis were elevated in the knock out mice.

Impact: The study results related to the role of ABCA2 in prostate cancer tumor progression could potentially lead to clinical improvements in treatment to overcome multi-drug resistance and tumor relapse. Future studies could expand this investigation.

Marvella E. Ford, Ph.D. (Medical University of South Carolina)
Rebecca Bullard-Dillard, Ph.D. (Claflin University)
Judith D. Salley, Ph.D. (SC State University)
Leroy Davis, Ph.D. (Voorhees College)

ABSTRACT

Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program

Background: There is a critical need to increase the number of racially and ethnically diverse prostate cancer researchers. The purpose of this 3-year project is to develop a prostate cancer research training program at the Medical University of South Carolina (MUSC) with 12 students from the following three Historically Black Colleges and Universities (HBCUs) in South Carolina: Claflin University, South Carolina State University (SCSU), and Voorhees College. Students from the three HBCUs (defined as "Student Fellows") will participate in research internships in the laboratories/research units of senior prostate cancer research scientists at MUSC.

Specific Aims: Aim 1.) To provide training in the basics of research design and methods to four Student Fellows each year through participation in the MUSC Summer Undergraduate Research Program (SURP); Aim 2.) To immerse four Student Fellows each year in a prostate cancer research training curriculum.

Results: In 2009-2010, eight Student Fellows were identified, recruited to participate and admitted to the DOD Collaborative Undergraduate HBCU Student Summer Prostate Cancer Training Program. The Student Fellows were matched with Research Mentors at MUSC, with whom they conducted research in the summers of 2009 and 2010. Each Student Fellow prepared a scientific paper and gave a scientific presentation at the end of the Training Program. Each Student Fellow also completed an 8-week Graduate Record Examination Test Preparation Course at a local Kaplan Center. In addition, a total of 73 students from the three HBCUs attended the Ernest E. Just Symposium at MUSC in February of 2010. The symposium is used as a platform to recruit racially and ethnically diverse students to MUSC.

Conclusions: In the summers of 2009-2010, we provided state-of-the art comprehensive prostate cancer research education and training opportunities for **eight** Student Fellows from HBCUs in South Carolina. Each Student Fellow prepared a scientific paper and gave a scientific presentation.

Impact Statement: Through this funding mechanism, we are developing a cadre of scientists who are well-prepared to conduct research spanning the continuum from basic science to clinical science to population-based research.

Appendix B
Summaries of Students' Abstracts from the Summer Research Program

2009 Student Fellow Abstracts

Scharan Clarke
Claflin University

ABSTRACT

Does The Preoperative Evaluation Of Men With Bladder Outlet Obstruction Affect The Outcomes Of Outlet Reduction Procedures?

Objective: Evaluate whether preoperative workup affects surgical outcomes in patients with symptomatic urinary obstruction. Noninvasive uroflow and check of post void residual urine has traditionally been adequate assessment for non complicated patients with symptomatic obstruction. We evaluated our series to see if we had clinically significant outcome differences. **Methods:** We retrospectively reviewed our series of 119 patients extracted randomly from 2004 to 2009. These patients were selected by procedure code for both electrosurgical resection and photovaporization of the prostate. We found 119 patients who had undergone outlet reducing procedures. **Results:** 68 (57%) underwent electrosurgical resection and 51 (43%) underwent photovaporization of the prostate. The mean preoperative IPSS was 18 with QOL score 3. Thirty two (29%) patients underwent CMG, 35 (32%) underwent noninvasive uroflow, 43(39%) had no preoperative urodynamic testing. The mean PVR was 199mL and 153mL respectively. The mean prostate size was 48cc, 44cc and 52cc respectively. Two patients in each group had incontinence preoperatively 6% for CMG and noninvasive 5% of untested. Retention was present in 9 (28%), 2 (6%), 3 (7%) respectively. Preoperative use of medical therapy was seen in 24(75%), 32(91%), 29(67%) respectively. Operative time was lowest for patients with noninvasive studies with a mean of 55 minutes then CMG at 59 minutes and no studies at 67 minutes. Hospital stay was shortest with noninvasive testing mean of 0.4 days. CMG had a mean of 0.96 days and those with no testing stayed 1.2days. Catheters came out first in those with noninvasive testing mean of 1.2 days, 1.3 with no testing, and 1.9 days with CMG. Two complications were noted in both the noninvasive group and those without testing. Post operatively the mean IPSS was 11.2 in the CMG group, 10 in the noninvasive, and 9.4 in those without studies. This is a change of 9.2, 9.5, 5.6 points respectively. Mean peak flow and PVR were 13ml/sec, and 119cc; 11.7ml/sec, and 118cc; 9ml/sec and 90cc respectively. One patient (2%) had de novo incontinence in the noninvasive group. Five (15%) patients in the CMG group, 4(11%) in the noninvasive, and 1(2%) in the non studied group required recatheterization. Medical therapy was reinstituted in 7 (21%), 4(11%), 1(2%) patients respectively. Mean follow up was 15.7 months in the CMG group, 20 months in noninvasive, and 16 months in those without studies. **Conclusions:** In our series more invasive preoperative evaluation did not lead to better clinical outcomes based on recatheterization rates, IPSS, or restarting medical therapy. However, intraoperative complications were more common as was de novo incontinence with less invasive testing.

Andrea Gibson
Claflin University

ABSTRACT

Enhancing Gene Delivery to Cancer Cells

BACKGROUND: Adenoviral delivery to cancerous cells has potential as a new therapy but is also factor for an adenovirus to enter a cell. HDACi and polymers have been proven to enhance the transduction of an adenovirus. **OBJECTIVE:** This study involves the investigation of a cell line of prostate cancer cells that infects poorly and to test if HDACi or the polymer EGDE-3, 3' will increase the infectivity of the cell line. **METHODS:** Infectivity and transgene expression was measured by flow cytometry following exposure to an adenovirus that expresses green fluoresecent protein. From this, the percentage of cells that were GFP positive were calculated. Also GFP intensity was determined from this as well. **RESULTS:** The results indicate that HDACi increased infectivity in the prostate cancer cells more than 5-fold at MOI's below 10. However EDGE-3, 3' did not increase infectivity. **CONCLUSIONS:** Therefore, EDGE-3, 3' did not work as well as it did in a previous study using bladder cancer cells. HDACi may be more suitable for enhancing adenoviral transgene expression in prostate cancer cells.

CoDanielle Greene
SC State University

ABSTRACT

Role of ABCA2 in Prostate Tumor Progression

Background: Prostate cancer is responsible for an estimated 33% of all newly diagnosed cancers in men. Unfortunately, the tumors caused by the disease do not always respond to the drugs (chemotherapy). Therefore, determining what causes the tumors to become resistant is important to efficiently treat the cancer. **Objective:** This study involves determining the role of ABCA2 expression because it has been associated with resistance to chemotherapy and multi-drugs. The Objectives were to determine if ABCA2 is correlated with tumor progression and to determine whether ABCA2 has an effect on the grade of prostate tumors and instances of metastasis. **Methods:** To examine the objectives, a knock out line was created using the Transgenic Adenocarcinoma of Mouse Prostate (TRAMP) model and compared to wild types by various methods including: Western Blotting Analysis, PCR, MRI imaging, Vimentin and Desmin analyses, Scratch Assays, and Transient Transfections. **Results:** Although prostate tumor progression was similar in both lines, the instances of metastasis were elevated in the knock outs. **Conclusions:** This study increases our understanding of the role of a protein which could indeed be the link to revising treatments so that they will overcome the occurrences of multi-drug resistance and tumor relapse.

Samantha Jones
SC State University

ABSTRACT

Isolation and *ex vivo* expansion of CD8+ T cells

Background: Prostate cancer is one of the leading causes of cancer-related deaths in American men. There are many available therapies for men with localized prostate cancer, which most of the time have serious side effects and negatively affect the patient's quality of life. There are no current treatments for metastatic prostate cancer. There are new ideas for taking an immunologic approach to treating prostate cancer through the use of antigen-specific T cells. The prostate antigen-specific T cells present in the human male body have low affinity and are not adequate enough to create an effective immune response. Because the female human body also contains these prostate-specific T cells, but contains no self antigens because of the absence of a prostate, it was predicted that the affinity of these female donor prostate-specific T cells will be higher than that of the prostate-specific T cells in men. **Hypothesis:** Therefore, our hypothesis is that T cells capable of killing prostate cancer cells are more abundant and have higher affinity in females than males and these T cells can be activated and expanded as a potential therapeutic for prostate cancer patients. **Methods:** To test this hypothesis, we raised and matured DC's from the monocytes of the blood of a female donor. We then pulsed these mature DC's with prostate antigen peptides (PSMA and PSCA) and co-cultured them with purified $CD8^+$ T cells from the same donor. Finally, we analyzed the cultures using flow cytometry for expanded prostate-specific CTLs. **Results:** We were able to raise prostate-specific CTLs using this method and plan to move forward using this method to develop new immune therapies for the treatment of prostate cancer.

2010 Student Fellow Abstracts

Jonathan Brown
Claflin University

Abstract

NOV-002 Induces
S-Glutathionylation of Serpin A1 and A3 in Human Plasma

The objective of the experiment was to identify the S-glutathionylation patterns of serpins in plasma from cancer patients via Western blot analysis. The results concluded that cancer patients have different Serpin A1 and A3 glutathionylation amounts after receiving the NOV-002 treatment, therefore proving that S-glutathionylation of serpins occur after receiving the chemotherapeutic or drug, NOV-002.

Scharan Clarke
Claflin University

Abstract

What Factors Can Predict the Success of Sacroneuromodulation When Used in Patients with Urinary Retention?

The objective of this study was to determine if any preoperative factors could help predict better clinical outcomes in the setting of urinary retention. Performed a retrospective chart review from 2000 to 2010 of procedures performed by three dedicated voiding dysfunction specialist. The preoperative and intraoperative factors evaluated do not appear to give us significant prognostic data.

DeAngelo Dinkins
SC State University

Abstract

Redox Protein Expression and Susceptibility to Therapeutic Intervention in Arcap Prostate Cancer Cells

Thioredoxin is a redox-regulating protein that plays a central role in regulating cellular redox and preventing cell death. It was hypothesized that increased expression of redox proteins is an underlying cause for the aggressive, therapy-resistant prostate cancer phenotype.

Ebonie Fuller
SC State University

Abstract

Evaluating an Intervention to Improve Perceptions of Cancer Clinical Trials among Racially Diverse Communities in South Carolina

The objective of the study was to conduct a cancer clinical trials education intervention with racially diverse groups in South Carolina. The intervention consisted of a 30-minute cancer clinical trial educational presentation. Providing cancer clinical trials information to racial and ethnic minorities led to more positive perceptions of cancer clinical trials. It was concluded that ARCaPm cells do have an increased expression of redox proteins. Therefore they are more resistant to cancer treatments.

2011 Student Fellow Abstracts

Jonathan Brown
Claflin University

ABSTRACT

Glutathione S-Transferases pi (GSTpi) Catalyzes PSSG of Serpins A1 and A3 in Mouse Plasma

Introduction: S-glutathionylation is the specific post-translational modification on cysteine residues by the addition of glutathione. S-glutathionylation alters the functionality and/or sub-cellular localization of proteins following oxidative or nitrosative stress. Moreover, S-glutathionylation plays an important role in both serpins and glutathione S- transferase pi (GSTpi). Serpins are serine protease inhibitors that make up about 2% of the total protein in human plasma. GSTpi is a subgroup of GST family that provides cellular protection against free radical and carcinogenic compounds due to its detoxifying function and importantly its glutathionylase activity. It has been shown that GSTpi deficient mice have higher levels of white blood cells.

Hypothesis: We propose this observation is due to the lack of redox regulation of Serpin A1 and/or A3. Glutathione S- transferase pi (GSTpi) catalyzes protein s-glutathionylation (P-SSG) of Serpins A1 and A3 in plasma. We predict that GST -/- mice will have less modified serpins.

Methods: GSTpi wild type (+/+) and GSTpi knockout (-/-) mice will be treated with a control, oxidative stress, and nitrosative stress (saline, NOV-002, and PABA/NO, respectively). Western blot analysis will also be performed to analyze the P-SSG levels of Serpins A1 and A3.

Results: According to the Western blot analyses, the glutathionylation patterns in both blots illustrated that glutathionylation was increased in the plasma samples that were treated with NOV-002. On the contrary, the plasma samples that were not treated with NOV-002 had less glutathionylation patterns compared to those that were treated with the drug. This western blot that was done on the serpin group, Serpin A1 illustrated that Serpin A1 were found in all of the eight plasma samples taken from cancer patients and were S-glutathionylated.

Conclusion: GSTpi indeed catalyzes S-gluatathionylation in mouse serum. However, more studies are required to provide accurate findings to support this hypothesis. Due to time restraints, replications were not performed to guarantee the accuracy of the results gathered. Based on the results provided, it illustrates that S-glutathionylation increase as the dosage of NOV-002 becomes greater. These results could serve as a pharmacodynamic biomarker for NOV-002 bioactivity, could contribute to bone marrow proliferation of patients that undergo chemotherapy, and sets a foundation for further studies that can be performed to focus on cancer patients' quality of life; in addition, to increase their myeloproliferative status.

Jazzmine Clemons
Claflin University

ABSTRACT

The effect of cytokines on T cell antioxidant capacity

Introduction: Persistence of effector cytotoxic T lymphocytes during an immunological response is critical for successfully controlling a viral infection or tumor growth. Various cytokines are known to play an important part in regulating the immune response and are known to function as growth and survival factors for antigen-experienced T cells.

Hypothesis: Based on previous work in our laboratory, we hypothesized that cytokines would differentially affect the antioxidant capacity of T cells.

Methods: The pmel-1 transgenic mouse model was used to create the mouse cell lines, in vitro activation and surface and intracellular GSH staining was conducted by flow cytometry. Total RNA extraction and reverse transcription was performed, and quality controls were used with real time PCR-based array analysis to confirm the lack of DNA contamination and successfully tested for RNA quality and PCR performance.

Results: IL-12 and IL-21 favored the generation of central memory-like T cells, as evidenced by the upregulated expression of CD62L. Importantly, we found that T cells cultured in the presence of these cytokines expressed increased levels of intracellular glutathione. In contrast, IL-2 did not affect any of the above parameters

Conclusions: The results suggest that IL-12 and IL-21 could increase the antioxidant capacity of T cells, potentially becoming a more successful tool for T cell immunotherapy.

Kendrick Henderson
Claflin University

ABSTRACT

The role of vitamin D and parathyroid hormone in African Americans and Caucasians with early stage prostate cancer

Introduction: Prostate cancer is a malignant tumor that begins in the prostate gland and is the second most deadly cancer in men in the United States. It is has been recently reported where low levels of circulating vitamin D strongly correlate with death from prostate cancer, raising the possibility that vitamin d deficiency overtime would favor the progression of subclinical prostate cancer to clinical disease. It appears the appropriate amount vitamin D3 supplementation will prevent prostate cancer progression by promoting differentiation of prostate cancer cells, and maintaining the differentiated phenotype of prostate epithelial cells. In the past, vitamin D was well known to be an important supplement for its role in calcium regulation and mineralization of the bone. Vitamin D3 is actually a prehormone which is manufactured by the body after sunlight exposure. Alternative absorption is by supplementation. The objective of the study is to conduct a clinical study on patients diagnosed with early-stage prostate cancer, and test if vitamin D3 supplementation at 4,000 international units (iu) per day for up to twelve months is safe. Parathyroid hormone plays an important role in normal bone formation, development of mammary gland, skin, and teeth, and the regulation of the contractility of smooth muscle.

Hypothesis: It was hypothesized that this regimen of supplementation corrects any vitamin d deficiency. It was also hypothesized that this regimen will correct secondary hyperparathyroidism, which is often a consequence of vitamin d deficiency.

Methods: Serum levels of 25(oh) were measured using the proprietary, radioimmunoassay-based technology. Parathyroid hormone levels were measured in the clinical laboratory. Statistical analyses relied on applications of the student's t-test, including paired as well as unpaired comparisons.

Results: Preliminary analysis of the data suggested that there are significant differences of the PTH values between Caucasians and African Americans. Also, the supplementation of the circulating vitamin D eliminates significant differences between the two ethnic groups and restores normal levels of PTH.

Conclusion: Based on the preliminary analysis of the data, the null hypothesis was rejected because of statistical differences between the ethnic groups.

Claudia Thompson
SC State University

ABSTRACT

Hormone Supplementation and Risk for Prostate Cancer

Abstract: The purpose of this study is to use preexisting data to study the incidence of prostate cancer in men who are being treated with hormone and nutrition supplementation to achieve normal or above normal testosterone levels. We will carefully study the data given on the patients' charts and look at their risk of prostate cancer. With this knowledge, we may be able to find a relationship between some of the variables on the chart and their incidence of prostate cancer.

Introduction: Prostate Cancer is the most common non-skin malignancy in men and the American Cancer Society estimated that in 2010 217,730 men would be diagnosed with prostate cancer and that 32,050 men would die of the disease. Statistics show that prostate cancer is the most frequently diagnosed cancer in men and the second leading cause of death. Fortunately, they are many more men living with prostate cancer rather than dying from it. Now that the mortality rate is down we need to focus on the morbidity of the disease and the quality of life the cancer survivors are left with. By removing testosterone we are able to kill off the cancer cells because there is a direct relationship between testosterone and prostate cancer. Unfortunately without testosterone these survivors can go through side effects like hypogonadism. There is a concern that there is an increased risk of prostate cancer in men on testosterone supplementation, which has health care providers skeptical of replacing testosterone in men who have been treated for prostate cancer.

Patients and Methods: The patients will be only men, not women nor children, who receive hormone and/or nutrition supplementation from Cenegenics Carolinas. We will obtain their charts and study data points such as blood work (CBC, CMP, cholesterol profiles, hormone profiles, PSA, CRP, Vitamin D, HbA1C) and urinalysis as well as physical exam findings such as BMI, lean muscle mass, % body fat, and more. This information we study will be looked at carefully to identify a possible relationship between them and incidence rate of prostate cancer. No new data will be collected during this stage of the study.

Potential Benefits and Knowledge: This study can potentially support testosterone replacement in men without increased risk of development of prostate cancer, which could provide men in the study population with peace of mind with ongoing treatment. This may also encourage all men diagnosed with prostate cancer to seek treatment because the side effects of treatment can be reversed. This study is important because it can open this therapy, testosterone replacement, to a broader population of men. The data points we study may also show other parameters which are associated with increased or decreased risk of prostate cancer. This can be the next step forward in prostate cancer with the first being lower the mortality rate.

Appendix C
Academic Accomplishments of the Student Fellows from 2009-2012

Year of Program Participation: 2009					
Student Name	**Summer Research Project**	**Funding Source**	**Publications and Presentations, and Honors**	**GRE Test Status**	**Graduate School Admission**
Scharan Clarke (Participated in the Training Program in the Summer of 2009 and the Summer of 2010) Graduate, Claflin University	**Mentor:** Harry Clarke, M.D., Ph.D. **Research Projects:** **2009:** Does the Preoperative Evaluation of Men with Bladder Obstruction Affect the Outcomes of Outlet Reduction Procedures? **2010:** What Factors Can Predict the Success of Sacroneuromodulation When Used in Patients with Urinary Retention	Department of Defense	**Publications:** No publications to date **Presentations:** 2009/2010 MUSC Summer Undergraduate Research Program 2011 IMPaCT Conference Poster Presentation	Has taken the GRE in the Fall 2009.	Was accepted into the Master's of Public Health Program at the University of South Carolina and is enrolled in the Program. Previously, applied to graduate school at: 1. University of South Carolina, School of Public Health 2. The Medical College of Georgia, Student Training And Research Program (STAR Program) Applied to the following summer research training programs at Wake Forest University: • Translational Science Institute Scholars Program • Excellence in Cardiovascular Sciences Summer Research Program
Andrea Gibson Graduate, Claflin University	**Mentor:** Christina Voelkel-Johnson, Ph.D. **Research Project:** Enhancing Gene Delivery To Cancer Cells	Department of Defense	**Publications:** No publications to date **Presentations:** 2009 MUSC Summer Undergraduate Research Program 2011 IMPaCT Conference Poster Presentation	Has taken the GRE and DAT	Applied to dental school at: 1. Meharry Medical College School of Dentistry
Co-Danielle Green (Participated in the Training Program in the Summer of 2009 and the Summer of 2011) Graduate, SC State University	**Mentors:** Danyelle Townsend, Ph.D. 2009 **Research Project:** Role of ABCA2 in Prostate Tumor Progression	Department of Defense	**Publication:** Mack JT, Helke KL, Normand G, **Green C, Townsend DM**, Tew KD. ABCA2 transporter deficiency reduces incidence of TRAMP prostate tumor metastasis and cellular chemotactic migration. Cancer Lett; 300(2):154-61. **Presentations:** 2009 MUSC Summer Undergraduate Research Program	Has taken the GRE in Summer 2011	Has applied to graduate school at the following institutions: 1. Medical University of South Carolina 2. Mercer University 3. University of South Carolina
Samantha Jones Graduate, SC State University	**Mentors:** Drs. Shikhar Mehrotra and Mike Nishimura **Research Project:** Isolation And *Ex Vivo* Expansion of Antigen-Specific CD8+ T Cells	Department of Defense	**Publications:** No publications to date **Presentation:** 2009 MUSC Summer Undergraduate Research Program	Has taken the GRE in Spring 2010.	Fall 2011: Was accepted to Florida A&M University (FAMU) School of Pharmacy, PhD Program in Pharmaceutical Sciences.

Year of Program Participation: 2010					
Student Name	**Summer Research Project**	**Funding Source**	**Publications, Presentations and Honors**	**GRE Test Status**	**Graduate School Admission**
Jonathan Brown (Participated in the Training Program in the Summer of 2010 and the Summer of 2011) Graduate, Claflin University	**Mentor:** Danyelle Townsend, Ph.D. **Research Projects:** **2010:** NOV-002 Induces S-Glutathionylation of Serpin A1 and A3 in Human Plasma **2011:** GSTpi catalyzes S-glutathionylation of Serpins A1 and A3 in plasma	Department of Defense	**Publications:** No publications to date **Presentations:** 2010 MUSC Summer Undergraduate Research Program 2011 IMPaCT Conference Poster Presentation 2011 Annual Biomedical Research Conference for Minority Students (ABRCMS) **Honors:** 2011 Scholarship Recipient, 5th Annual National Conference on Health Disparities	Has taken the GRE in August 2011.	• Has applied to a graduate program in social work at the University of Southern California. Is applying to the following graduate schools/programs: Physician Assistant Studies: • University of Florida • East Carolina University • Medical University of South Carolina Public Health Studies: • Ohio State University • University of Georgia • University of Arkansas

Year of Program Participation: 2010 Continued					
Student Name	**Summer Research Project**	**Funding Source**	**Publications, Presentations and Honors**	**GRE Test Status**	**Graduate School Admission**
Scharan Clarke (Participated in the Training Program in the Summer of 2009 and the Summer of 2010) Graduate, Claflin University	**Mentor:** Harry Clarke, M.D., Ph.D. **Research Projects:** **2009:** Does the Preoperative Evaluation of Men with Bladder Obstruction Affect the Outcomes of Outlet Reduction Procedures? **2010:** What Factors Can Predict the Success of Sacroneuromodulation When Used in Patients with Urinary Retention	Department of Defense	**Publications:** No publications to date **Presentations:** 2009/2010 MUSC Summer Undergraduate Research Program 2011 IMPaCT Conference Poster Presentation	Has taken the GRE in the Fall 2009.	Was accepted into the Master's of Public Health Program at the University of South Carolina and is enrolled in the Program. Previously, applied to graduate school at: 1. University of South Carolina, School of Public Health 2. The Medical College of Georgia, Student Training And Research Program (STAR Program) Applied to the following summer research training programs at Wake Forest University: • Translational Science Institute Scholars Program • Excellence in Cardiovascular Sciences Summer Research Program

Year of Program Participation: 2010 Continued					
Student Name	**Summer Research Project**	**Funding Source**	**Publications, Presentations and Honors**	**GRE Test Status**	**Graduate School Admission**
De'Angelo Dinkins (Participated in the Training Program in the Summer of 2010 and the Summer of 2011) Senior, SC State University	**Mentor:** Christina Voelkel-Johnson, Ph.D. **Research Projects:** Redox Protein Expression and Susceptibility to Therapeutic Intervention in Arcap Prostate Cancer Cells	Department of Defense	**Publications:** No publications to date **Presentations:** 2010 MUSC Summer Undergraduate Research Program	Has taken the GRE in fall of 2011	Plans to apply to the following graduate schools: 1. Medical University of South Carolina 2. Vanderbilt 3. University of North Carolina-Chapel Hill
Ebonie Fuller Senior, SC State University	**Mentor:** Marvella E. Ford, Ph.D. **Research Project:** Evaluating an Intervention to Improve Perceptions of Cancer Clinical Trials among Racially Diverse Communities in South Carolina	Department of Defense	**Publication:** Manuscript entitled "Evaluating an Intervention to Improve Clinical Trial Perceptions among Racially Diverse Communities in South Carolina" is under peer review. **Presentations:** 2010 MUSC Summer Undergraduate Research Program 2010 MUSC Student Research Day Oral Presentation 2011 IMPaCT Conference Poster Presentation	Plans to take the MCAT in the Summer of 2011	Plans to apply to Medical School at: 1. Medical University of South Carolina 2. East Carolina University

Year of Program Participation: 2011					
Student Name	**Summer Research Project**	**Funding Source**	**Publications, Presentations and Honors**	**GRE Status**	**Graduate School Admission**
Jonathan Brown (Participated in the Training Program in the Summer of 2010 and the Summer of 2011) Graduate, Claflin University	**Mentor:** Danyelle Townsend, Ph.D. **Research Projects:** GSTpi catalyzes S-glutathionylation of Serpins A1 and A3 in plasma	Department of Defense	**Publications:** No publications to date **Presentations:** 2010 MUSC Summer Undergraduate Research Program 2011 IMPaCT Conference Poster Presentation 2011 Annual Biomedical Research Conference for Minority Students (ABRCMS) **Honors:** 2011 Scholarship Recipient, 5th Annual National Conference on Health Disparities	Has taken the GRE in August 2011.	• Has applied to a graduate program in social work at the University of Southern California. Plans to apply to the following graduate schools/programs: Physician Assistant Studies: • University of Florida • East Carolina University • Medical University of South Carolina Public Health Studies: • Ohio State University • University of Georgia University of Arkansas
Jazzmine Clemons Graduate, Claflin University	**Mentor:** Shikhar Mehrotra, Ph.D. **Research Project:** T Cell Immunotherapy	Department of Defense	**Publications:** No publications to date **Presentations:** 2011 MUSC Summer Undergraduate Research Program	Has taken the GRE.	Fall 2012: Has been accepted to Hampton University's post bachelorette program. Plans to apply to MUSC medical school in 2014.
Kendrick Henderson Graduate, Claflin University	**Mentor:** Sebastino Gattoni-Celli, M.D. **Research Project:** The role of vitamin D and parathyroid hormone in African Americans and Caucasians with early stage prostate cancer	Department of Defense	**Publications:** No publications to date **Presentations:** 2011 MUSC Summer Undergraduate Research Program **Honors:** 2011 Scholarship Recipient, 5th Annual National Conference on Health Disparities	Has taken the GRE.	Fall 2012: Was accepted to the University of South Carolina's Master's in Public Health Administration Program.

Year of Program Participation: 2011 Continued					
Student Name	**Summer Research Project**	**Funding Source**	**Publications, Presentations and Honors**	**GRE Status**	**Graduate School Admission**
Year of Program Participation: 2011	**Year of Program Participation: 2011**	**Year of Program Participation: 2011**	**Year of Program Participation: 2011**	**Year of Program Participation: 2011**	**Year of Program Participation: 2011**
Funding Source	**Publications, Presentations and Honors**	**GRE Status**	**Graduate School Admission**	Has not taken the GRE.	Plans to apply to graduate school.

Year of Program Participation: 2012 **These are current student fellows participating in the 2012 SURP program. Therefore it is too early to report additional accomplishments at this time. Many accomplishments are expected to occur during the course of the next few years following their participation.**					
Student Name	**Summer Research Project**	**Funding Source**	**Publications, Presentations and Honors**	**GRE Status**	**Graduate School Admission**
Sylvia Bridges Junior SC State University	**Mentor:** Dr. Victoria Findlay **Research Project:** The Effects of MiRNA on Prostate Cancer	Department of Defense	**Publication:** No publications to date **Presentation:** 2012 MUSC Summer Undergraduate Research Program	Has not taken the GRE.	
Deidra White Freshman SC State University	**Mentor: Dr. Dave Turner** **Research Project:** Implications of DNA Glycation Affecting Correlation of Racial Disparities in Prostate Cancer	National Institutes of Health/ National Cancer Institute	**Publication:** No publications to date **Presentation:** 2012 MUSC Summer Undergraduate Research Program	Has not taken the GRE.	
Myshayla Bell Sophomore Claflin University	**Mentor:** Dr. Shikhar Mehrotra **Research Project:** Overexpression of an Antigen in Melanoma Tumors and the Surrounding T Regulatory Cells using Immunohistochemistry	Department of Defense	**Publication:** No publications to date **Presentation:** 2012 MUSC Summer Undergraduate Research Program	Has not taken the GRE.	
Jasmine Fox Sophomore SC State University	**Mentor:** Dr. Erika T. Brown **Research Project:** IRS 1 Modulation of the DNA repair protein RAD51 in Breast Cancer	Department of Defense	**Publication:** No publications to date Research Program **Presentation:** 2012 MUSC Summer Undergraduate	Has not taken the GRE.	
Claudia Thompson (Participated in the Training Program in the Summer of 2011 and the Summer of 2012) Senior SC State University	**Mentor:** Dr. Danyelle Townsend **Research Project:** Targeting Protein Folding as a Therapeutic Strategy in Prostate Cancer	Department of Defense	**Publication:** No publications to date **Presentation:** 2012 MUSC Summer Undergraduate Research Program	Has not taken the GRE.	

Year of Program Participation: 2012 **These are current student fellows participating in the 2012 SURP program. Therefore it is too early to report additional accomplishments at this time. Many accomplishments are expected to occur during the course of the next few years following their participation.**					
Student Name	**Summer Research Project**	**Funding Source**	**Publications, Presentations and Honors**	**GRE Status**	**Graduate School Admission**
Laila Green Sophomore Claflin University	**Mentor:** Dr. Marvella E. Ford **Research Project:** Improving Perceptions of Cancer Clinical Trials through a Cancer Education Program	Department of Defense	**Publication:** No publications to date **Presentation:** 2012 MUSC Summer Undergraduate Research Program	Has not taken the GRE.	
Britney White Senior Claflin University	**Mentor: Dr. Patrick Woster** **Research Project:** Cancer Epigenetics: Using MTS Assays to determine cytotoxicity in drugs containing LSD1 and DNA methylation inhibitors	Department of Defense	**Publication:** No publications to date **Presentation:** 2012 MUSC Summer Undergraduate Research Program	Has not taken the GRE	